

This document provides pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a major, municipal permit. The discharges result from the combined sewer system (CSS) during wet weather events at overflow points within the collection system; referred to as combined sewer overflows (CSOs). The requirements and special conditions contained within this permit are in accordance with 9VAC25-31-50.C. and the Clean Water Act, CSO Control Policy, Section 402(q)(1).

1. Facility Name and Mailing Address:	Alexandria Combined Sewer System 301 King Street, Room 4100 Alexandria, VA 22313	SIC Code:	4952 WWTP
Facility Location:	The combined sewer system serves a 540 acre area of the City of Alexandria. See Attachment I.	City:	Alexandria
Facility Contact Name:	Rashad Young / City Manager	Telephone Number:	703-746-4300
2. Permit No.:	VA0087068	Expiration Date:	15 January 2012
Other VPDES Permits:	Not Applicable		
Other Permits:	VAR040057 – Phase II MS4 General Permit		
E2/E3/E4 Status:	Not Applicable		
3. Owner Name:	City of Alexandria		
Owner Contact / Title:	Richard Baier / Director of Transportation and Environmental Services	Telephone Number:	703-746-4019
4. Application Complete Date:	15 July 2011		
Permit Drafted By:	Douglas Frasier	Date Drafted:	22 October 2012 16 November 2012 22 January 2013 13 February 2013 13 March 2013 14 May 2013 20 May 2013
Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	26 November 2012
WPM Review By:	Bryant Thomas	Date Reviewed:	11 November 2012 24 January 2013 27 February 2013 14 March 2013 15 May 2013 21 May 2013
Public Comment Period:	Start Date: 12 July 2013	End Date:	12 August 2013
5. Receiving Waters Information:			
Receiving Stream Names:	Outfall 001: Oronoco Bay Outfall 002: Hunting Creek Outfall 003/004: Hooffs Run	Stream Codes:	Outfall 001: 1aPOT Outfall 002: 1aHUT Outfall 003/004: 1aHFF
Drainage Areas:	Outfall 001: 224 acres Outfall 002: 184 acres Outfall 003/004: 132 acres	River Miles:	Outfall 001: 108.72 Outfall 002: 0.60 Outfall 003/004: 0.70 / 0.63
Stream Basins:	Potomac River	Subbasins:	Potomac River
Sections:	Outfall 001/002: 06 Outfall 003/004: 07	Stream Classes:	Outfall 001/002: II Outfall 003/004: III

Special Standards:	Outfall 001/002: b,y	Waterbody IDs:	Outfall 001: VAN-A12E
	Outfall 003/004: b		Outfall 002: VAN-A13E
			Outfall 003/004: VAN-A13R

Outfall 001 / Outfall 002 / Outfall 003 / Outfall 004

7Q10 Low Flow:	Not Applicable*	7Q10 High Flow:	Not Applicable*
1Q10 Low Flow:	Not Applicable*	1Q10 High Flow:	Not Applicable*
30Q10 Low Flow:	Not Applicable*	30Q10 High Flow:	Not Applicable*
Harmonic Mean Flow:	Not Applicable*	30Q5 Flow:	Not Applicable*

\*Overflows only occur during wet weather events. The flow within the receiving streams would be highly variable; dependent upon the previous precipitation event, amount/type of precipitation and longevity of the event. A mixing zone determination is not feasible.

#### 6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

<input checked="" type="checkbox"/> State Water Control Law	<input checked="" type="checkbox"/> EPA Guidelines
<input checked="" type="checkbox"/> Clean Water Act	<input checked="" type="checkbox"/> Water Quality Standards
<input checked="" type="checkbox"/> VPDES Permit Regulation	<input checked="" type="checkbox"/> Other: CSO Control Policy
<input checked="" type="checkbox"/> EPA NPDES Regulation	CWA Section 402(q)(1)

7. Licensed Operator Requirements: Not Applicable

8. Reliability Class: Not Applicable

#### 9. Permit Characterization:

<input type="checkbox"/> Private	<input type="checkbox"/> Effluent Limited	<input checked="" type="checkbox"/> Possible Interstate Effect
<input type="checkbox"/> Federal	<input checked="" type="checkbox"/> Water Quality Limited	<input type="checkbox"/> Compliance Schedule
<input type="checkbox"/> State	<input type="checkbox"/> Whole Effluent Toxicity Program	<input type="checkbox"/> Interim Limits in Permit
<input checked="" type="checkbox"/> POTW	<input type="checkbox"/> Pretreatment Program	<input type="checkbox"/> Interim Limits in Other Document
<input checked="" type="checkbox"/> TMDL		

#### 10. Wastewater Sources and Treatment Description:

A combined sewer system (CSS) is a wastewater collection system that conveys wastewaters (domestic, commercial and industrial) and stormwater via a single pipe. Normally, the system transports all of the wastewater to a publicly owned treatment works (POTW) for treatment. However, these types of collection systems are designed to overflow at certain points in the system during rainfall or snowmelt events when the volume of water exceeds the capacity of the collection system and/or the treatment capacity of the POTW. A combined sewer overflow (CSO) refers to CSS discharges at these points in the collection system. The CSOs discharge a mixture of stormwater, untreated human and industrial waste, possible toxic materials and debris into a water body during wet weather events.

The City of Alexandria CSS serves approximately 540 acres with a population of approximately 25,000. The majority of the sewershed is located in the Old Town area and consists of 6.2 miles of combined sewers with four (4) outfalls. During dry weather, all sanitary wastewaters are conveyed to the AlexRenew Water Resource Recovery Facility (VA0025160) for treatment. This treatment plant is owned and operated by the City of Alexandria, Virginia Sanitation Authority.

Dry weather discharges from a CSS are strictly prohibited under the Combined Sewer Overflow Control Policy.

Outfall locations and brief descriptions:

Outfall 001: Pendleton Street Outfall  
 Location: east end of Pendleton Street  
 Minimum rainfall for overflow event: approximately 0.06 inches

The wastewater flow originates from the North and South Trunks of the Pendleton Street Trunk Sewer, flowing into the Potomac Interceptor. The regulator structure is a diagonal weir, discharging through two flapper valve tide gates.

Outfall 002:      Royal Street Outfall  
                    Location: south end of Royal Street  
                    Minimum rainfall for overflow event: approximately 0.21 inches

This point in the CSS receives flow from the Royal Street Trunk Sewer, with all dry weather flow entering the Potomac Interceptor. The regulator is a 6 inch weir.

Outfall 003:      King/West Streets Outfall  
                    Location: under Duke Street at the crossing of Hooffs Run  
                    Minimum rainfall for overflow event: approximately 0.03 inches

This outfall and regulator are located in a box culvert that runs under Duke Street. Flows in this section of the CSS come from the Peyton Street Trunk Sewer and then to the Commonwealth Interceptor.

Outfall 004:      Hooffs Run Outfall  
                    Location: approximately 50 meters south of Duke Street  
                    Minimum rainfall for overflow event: approximately 0.16 inches

The regulator structure consists of an overflow weir upstream of inverted siphons; outfall structure is a flapper valve.

See **Attachment 2** for a map illustrating the locations of the outfalls.

The national framework for control of CSOs is found in the Environmental Protection Agency's (EPA) *Combined Sewer Overflow (CSO) Control Policy*, published on 19 April 1994 and later incorporated into the Clean Water Act, Section 402(q)(1) in 2000. This policy established a comprehensive and consistent approach for controlling discharges from CSOs.

The goals of the Policy are to:

- Ensure that if CSOs occur, they are only as a result of wet weather;
- Bring all wet weather CSO discharge points into compliance with the technology-based and water quality-based requirements of the Clean Water Act; and
- Minimize the impacts of CSOs on water quality, aquatic biota and human health.

The policy requires communities with CSOs to prepare a Long Term Control Plan (LTCP) detailing how they will accomplish these goals. The overall approach regarding the LTCP consists of three steps: system characterization, development and evaluation of alternatives and selection/implementation of the controls. In February 1999, the City of Alexandria's LTCP, consisting of the nine minimum controls (Section 17.e.), was approved by DEQ. The City of Alexandria elected to demonstrate that the controls in place would meet the Water Quality Standards by means of modeling. These tools were used to ascertain the frequency, duration and volume of CSO discharges. In addition, these models were used to predict the possible impacts on the receiving streams.

The 2006 305(b)/303(d) Water Quality Assessment Report stated that Hunting Creek did not support the Recreation Use and the Fish Consumption Use due to bacteria and polychlorinated biphenyls (PCBs), respectively. Outfall 002 discharges directly into Hunting Creek while Outfall 003 and Outfall 004 discharge to a tributary to Hunting Creek. Total Maximum Daily Loads (TMDLs) have been developed and approved for both impairments. This system has been identified as a source within each document. Please refer to Section 15 of this Fact Sheet for further details.

Point source components for TMDLs are implemented through the VPDES permitting programs while nonpoint source controls are implemented via a combination of best management practices (BMPs), state and/or local regulations.

TABLE 1  
OUTFALL DESCRIPTION

Number	Number of CSO Events	Average Duration of Overflow	Average Volume of Overflow	Estimated Annual Volume of Overflow	Latitude/ Longitude
001	28	2.32 hours	1.36 million gallons	35.21 million gallons	38° 48' 35" / 77° 02' 19"
002	25	1.92 hours	1.41 million gallons	31.27 million gallons	38° 47' 30" / 77° 02' 49"
003	58	6.05 hours	0.66 million gallons	36.67 million gallons	38° 48' 15" / 77° 03' 33"
004	28	8.04 hours	0.27 million gallons	9.63 million gallons	38° 48' 13" / 77° 03' 34"

\*Approximations; per permit application, dated 8 July 2011, for the time period of June 2010 – May 2011.

\*\*2011 Annual Report Model Summary

See Attachment 3 for the Alexandria topographic map.

11. **Sludge Treatment and Disposal Methods:** Not Applicable. There is no sludge generated within this system.

12. **Discharges and Monitoring Stations Located within Waterbodies VAN-A12E, VAN-A13E and VAN-A13R:**

TABLE 2  
DISCHARGES & MONITORING STATIONS

ID/ Permit Number	Facility Name	Type	Receiving Stream
VAN-A12E			
VAR051790	USPS – Maintenance Yard	Stormwater General Permits	Four Mile Run, UT
VAR051097	WMATA Four Mile Run Bus Garage		Four Mile Run
VAR051001	Robinson Terminal Warehouse		Potomac River
VAR051421	Arlington County Water Pollution Control Facility		Four Mile Run
VAR050997	Red Top Cab		Potomac River
VA0032000	US Department of Defense – Pentagon	Minor Industrial Discharge	Roaches Run
VA0025143	Arlington County Water Pollution Control Facility	Major Municipal Discharge	Four Mile Run
VAN-A13E			
1aHUT000.01	DEQ ambient monitoring station		
VA0025160	Alexandria Renew Enterprise WTP	Major Municipal Discharge	Hunting Creek
VAG110086	Virginia Concrete Company, Inc. – Alexandria	Ready-Mix Concrete General Permit	Hooffs Run
VAG756000	Falls Church Liberty	Carwash General Permit	Tripps Run
VAN-A13R			
VA0090107	Carlyle Development II	Minor Industrial Discharge	Old Cameron Run
VAG110009	Virginia Concrete Company, Inc. – Springfield	Ready-Mix Concrete General Permit	Backlick Run, UT Indian Run, UT

TABLE 2 (continued)			
VAN-A13R			
VAG830281	Fannon Petroleum Service	Petroleum General Permits	Hooffs Run
VAG830406	Shell 24501141808 – Skyhill		Cameron Run, UT
VAG830090	Aalans Service, Inc.		Tripps Run
VAG250107	GBA Associates – Annex Building	Cooling Water General Permits	Holmes Run
VAG250091	GBA Associates Limited Partnership		
VAG750124	Enterprise Rent A Car – Alexandria	Carwash General Permit	Holmes Run, UT

13. **Material Storage:** Not Applicable. There are no chemicals utilized or stored at this facility.

14. **Site Inspection:** Performed by DEQ-NRO Compliance Staff on 22 February 2012 (see **Attachment 4**).

Subsequent inspection conducted at AlexRenew Water Resource Recovery Facility and the City of Alexandria CSS by EPA Region III Enforcement Branch on 26 and 27 June 2012 (DEQ Compliance and Permitting Staff were present). See **Attachment 5** for the inspection report minus exhibits and attachments.

15. **Receiving Stream Water Quality and Water Quality Standards:**

a. Ambient Water Quality Data

*Outfall 001:*

This waterbody flows into the Potomac River, which, at this specific location, is under the jurisdiction of the District of Columbia. There is no DEQ monitoring data available for this receiving stream; however, the City was required to conduct ambient monitoring of Oronoco Bay during the last permit term. See **Attachment 6** for the monitoring locations and **Attachment 7** for the monitoring data.

A bacteria TMDL for this portion of the Potomac River was completed in July 2004 by the District Department of the Environment. No specific wasteload allocation was assigned to the City of Alexandria Combined Sewer System under this TMDL. Virginia was assigned a wasteload allocation as a whole, to be apportioned amongst all contributors.

*Outfall 002:*

The closest DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 0.28 rivermiles from Outfall 002.

The City has conducted extensive ambient monitoring of Hunting Creek during the last two permit terms. See **Attachment 8** for the monitoring location and **Attachment 9** for data collected during the last permit term.

*E. coli* monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for Hunting Creek has been completed and was approved by EPA on 10 November 2010. Outfall 002 was assigned a wasteload allocation of 6.26E+13 cfu/year for *E. coli* bacteria; representing an 80% reduction of current bacteria loadings from this outfall.

The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life sub-use; the thirty day mean is acceptable. However, the seven day mean and instantaneous levels have not been assessed.

The wildlife use is considered fully supporting.

*Outfalls 003/004:*

There are no DEQ monitoring stations located on Hooffs Run. The closest downstream DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 1.29 and 1.22 rivermiles downstream from Outfall 003 and Outfall 004, respectively.

*E. coli* monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for Hunting Creek has been completed and was approved by EPA on 10 November 2010. Wasteload allocations of  $6.26E+13$  and  $8.52E+11$  cfu/year for *E. coli* bacteria were assigned to Outfall 003 and Outfall 004, respectively. This represents a 99% reduction of current bacteria loadings at each outfall.

The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life sub-use; the thirty day mean is acceptable. However, the seven day mean and instantaneous levels have not been assessed.

The wildlife use is considered fully supporting.

*All Outfalls:*

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and PCB fish tissue monitoring. A PCB TMDL for the tidal Potomac River watershed has been completed and was approved by EPA on 31 October 2007. The City of Alexandria CSS was identified as a source of PCBs in the TMDL but no reductions in loadings are required in the TMDL.

There is a downstream impairment noted for aquatic life use for the Chesapeake Bay. There is a completed TMDL and all sources were included. The CSS was included in the watershed implementation plan (WIP) submitted to EPA on 29 November 2011. Essentially, wasteload allocations assigned to this CSS equates to the current Long Term Control Plan consisting of the Nine Minimum Controls.

See Attachment 10 for the full planning statement.

b. Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260-(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. Table 3 provides the receiving stream, section number, river basin and stream classification for each respective outfall.

TABLE 3				
Outfall	Receiving Stream	Section Number	River Basin	Stream Classification
001	Oronoco Bay	06	Potomac	II
002	Hunting Creek	06	Potomac	II
003/004	Hooffs Run	07	Potomac	III

Class II tidal waters in the Chesapeake Bay and its tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185 and maintain a pH of 6.0 – 9.0 standard units as specified in 9VAC25-260-50. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use. The applicable dissolved oxygen criteria concentrations are presented Attachment 11.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32° C and maintain a pH of 6.0 – 9.0 standard units (S.U.).

c. Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes and special standards for surface waters of the Commonwealth of Virginia. The receiving streams at Outfall 001 and Outfall 002, Oronoco Bay and Hunting Creek, respectively, are located within Section 06 of the Potomac River Basin. This section has been designated with special standards of "b" and "y".

The receiving stream at Outfall 003 and Outfall 004, Hooffs Run, is located within Section 07 of the Potomac River Basin. This section has been designated with a special standard of "b".

Special Standard "b" (Potomac Embayment Standards) established effluent standards for all sewage plants discharging into Potomac River embayments and for expansions of existing plants discharging into non-tidal tributaries of these embayments. 9VAC25-415, Policy for the Potomac Embayments controls point source discharges of conventional pollutants into the Virginia embayment waters of the Potomac River, and their tributaries, from the fall line at Chain Bridge in Arlington County to the Route 301 bridge in King George County. The regulation sets effluent limits for BOD<sub>5</sub>, total suspended solids, phosphorus and ammonia to protect the water quality of these high profile waterbodies.

The Potomac Embayment Standards are not applicable to these discharges since combined sewer overflows were explicitly exempted (9VAC25-415-30).

Special Standard "y" is the chronic ammonia criterion for tidal freshwater Potomac River and tributaries that enter the tidal freshwater Potomac River from Cockpit Point (below Occoquan Bay) to the fall line at Chain Bridge. During November 1 through February 14 of each year the thirty-day average concentration of total ammonia nitrogen (in mg/L) shall not exceed, more than once every three years on the average the following chronic ammonia criterion:

$$\left( \frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} \right) \times 1.45(10^{0.028(25 - \text{MAX})})$$

MAX = temperature in °C or 7, whichever is greater.

The default design flow for calculating steady state waste load allocations for this chronic ammonia criterion is the 30Q10, unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of this water quality criterion.

The Special Standard "y" is not applicable to these discharges since combined sewer overflows are intermittent by design; only the acute criterion would apply.

#### d. Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on 25 August 2011 for records to determine if there are threatened or endangered species in the vicinity of the discharge. The following threatened and endangered species were identified within a 2 mile radius of the outfalls: Brook Floater (mussel); Grizzled Skipper (butterfly); Bald Eagle; and Migrant Loggerhead Shrike (song bird). The monitoring and special conditions proposed in this draft permit protect the threatened and endangered species found near the discharge.

The stream that the facility discharges to is within a reach identified as having an Anadromous Fish Use. It is staff's best professional judgment that the proposed monitoring and special conditions will ensure protection of this use.

#### 16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

This reissuance involves four (4) outfalls discharging into three (3) different receiving streams. The receiving streams have been classified as Tier 1 based on the fact that all are listed as impaired and given the highly developed urban watersheds. The proposed permit monitoring requirements and special conditions have been developed per the CSO Control Policy which will result in attaining and/or maintaining all water quality criteria which apply to the receiving streams, including narrative criteria.

#### 17. Effluent Screening, Wasteload Allocations and Effluent Monitoring Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

a. Effluent Screening

Monitoring data obtained during the last permit term at each outfall has been reviewed and determined to be suitable for evaluation.

Please see **Attachment 12** for a summary of the monitoring data for all outfalls.

The following pollutants require a wasteload allocation analysis: ammonia, copper and zinc.

b. Wasteload Allocations (WLAs)

Discharge events from the City Of Alexandria CSS only occur during wet weather events. The stormwater subsequently increases the volume of water conveyed beyond the POTW's design capacity and the storage capability of the conveyance system. Since the duration of the discharge is not likely to exceed four days during a discharge event, only the acute criteria need to be discussed.

Water Quality Criteria (WQC) for human health and chronic toxicity are based upon long term, continuous exposure and are believed not applicable to this type of intermittent discharge.

Further, it is staff's best professional judgement to establish acute wasteload allocations by multiplying the acute water quality criteria by a factor of 2 unless site specific dilution data is available. The two times factor is derived from acute criteria being defined as one half of the final acute value (FAV) for a specific toxic pollutant. The FAV is determined from exposure of a specific toxicant to a variety of aquatic species and is based on the level of a chemical or mixture of chemicals that does not allow the mortality or other specified response of aquatic organisms. These criteria represent maximum pollutant concentration values, which when exceeded, would cause acute effects on aquatic life in a short time period.

Please see **Attachment 13** for the derived WLA for each outfall. It should be noted that the actual stream and discharge flows do not equate to 1 MGD as presented in the computations. These values are utilized to calculate the wasteload allocations while simulating tidal conditions; thus, obtaining the aforementioned two times factor.

Since Hooffs Run is an urban stream, draining a highly developed area and there is no available ambient data, it was staff's best professional judgement to utilize pH and temperature data from Hunting Creek monitoring results in order to calculate the WLAs for Outfall 003 and Outfall 004. The basis for this rationale is that Hunting Creek is ultimately the receiving stream for these two outfalls and the distance between the stream and the outfalls is less than one (1) mile.

c. Toxic Pollutants

## 1). Ammonia as N:

Staff evaluated the outfall monitoring data obtained during the last permit term and compared those results with the calculated acute wasteload allocations (WLAs). Staff found that all data points were below the acute WLAs for ammonia. It is staff's best professional judgement that these discharges do not pose a reasonable potential to cause or contribute to a violation of the ammonia criteria at this time. However, the permittee shall continue analyzing ammonia levels at each outfall during this permit term in order to monitor any potential increase in this pollutant and potential impacts on the receiving streams.

See **Attachment 12** for outfall monitoring results that were detected above the laboratory quantification level (QL) and **Attachment 13** for the subsequent WLA calculations.

## 2). Total Residual Chlorine:

Currently, there is no disinfection at any of the four (4) outfalls; therefore, a reasonable potential assessment for chlorine is not warranted.

## 3). Metals/Organics:

Monitoring data for all outfalls necessitated a reasonable potential analysis for copper and zinc since the sampling results were found above the quantification levels.

Data from Outfall 001, Outfall 003 and Outfall 004 indicates that neither metal is currently a pollutant of concern at these discharge points. All data points were below the acute WLA for both metals.



Outfall 002 data indicates that the copper values ascertained during monitoring may be a pollutant of concern; conversely, zinc is not a pollutant of concern at this outfall. Subsequent analysis will be completed by DEQ staff after submission of monitoring data.

See Attachment 14 for the metal analyses for each outfall.

d. Effluent Monitoring Summary

Effluent monitoring requirements are presented in the following table. Monitoring requirements were established for pH, carbonaceous-biochemical oxygen demand (cBOD<sub>5</sub>), total suspended solids (TSS), dissolved oxygen (DO), total kjeldahl nitrogen (TKN), ammonia as N, *E. coli*, nitrate+nitrite, total nitrogen (TN), total phosphorus (TP), chlorides, total recoverable zinc, total recoverable copper, rainfall amount, rainfall duration and duration of discharges.

e. Nine Minimum Controls (NMCs)

This permit requires continued implementation of the nine minimum controls (current approved LTCP), as set forth in the CSO Control Policy:

1). Conduct Proper Operations and Regular Maintenance Programs.

The permittee shall continue to implement the operation and maintenance plan for the combined sewer system (CSS) that includes the elements listed below. The permittee shall update the plan to incorporate any changes to the system and shall operate and maintain the system accordingly.

(a) Designation of a Manager for the CSS.

The permittee shall designate a person to be responsible for the wastewater collection system.

(b) Inspection and Maintenance of CSS.

The permittee shall inspect and maintain all CSO structures, regulators and tide gates to ensure proper working condition, adjusted to minimize CSOs and tidal inflow. The permittee shall inspect each CSO outfall at an appropriate frequency to ensure no dry weather overflows are occurring. The inspection shall include, but is not limited to, entering the regulator structure if accessible, determining the extent of debris and grit buildup and removing any debris that may constrict flow, cause blockage or result in a dry weather overflow. The permittee shall record in a maintenance log book the results of the inspections. For CSO outfalls that are inaccessible, the permittee may perform a visual check of the overflow pipe to determine whether or not the CSO is occurring during dry weather flow conditions.

(c) Provision for Trained Staff.

The permittee shall continue to ensure the availability of trained staff to complete the operation, maintenance, repair and testing functions required to comply with the terms and conditions of this permit.

(d) Allocation of Funds for O&M.

The permittee shall allocate adequate funds specifically for operation and maintenance (O&M) activities. The permittee shall ensure the necessary funds, equipment and personnel have been committed to carry out the O&M plan for the next fiscal year.

2). Maximize Use of the Collection System for Storage.

The permittee shall maximize the in-line storage capacity of the CSS. The permittee shall maintain all dams or diversion structures; minimize discharges from the CSS outfalls; and maintain maintenance records.

3). Control of Non-Domestic Discharges.

The permittee shall continue to implement selected CSO controls to minimize the impact of non-domestic discharges.

## 4). Maximize Flow to the Publicly Owned Treatment Works (POTW).

The permittee shall convey, to the greatest extent practicable, all wet weather flows to the POTW within the constraints of the CSS and the capacity of the POTW. The POTW is owned, operated and maintained by the City of Alexandria, Virginia Sanitation Authority and is regulated under a separate VPDES permit (VA0025160). The permittee shall maintain records to document these actions.

## 5). Prohibit Combined Sewer Overflows during Dry Weather.

Dry weather overflows from CSS outfalls are prohibited. Dry weather flow conditions shall mean the flow in a combined sewer that results from sanitary sewage, industrial wastewater and infiltration/inflow; with no contribution from stormwater runoff or stormwater induced infiltration.

All dry weather overflows must be reported to DEQ-NRO and the local health department within 24 hours of acknowledgement. The permittee shall begin corrective action immediately, monitor the dry weather overflow until the overflow has been eliminated and shall record, in the inspection log book, an estimate of the beginning and ending times of the discharge, estimated discharge volume and corrective measures taken.

## 6). Control Solid and Floatable Materials.

The permittee shall implement measures to control solid and floatable materials in the CSS. Such measures shall include, but not limited to, regular catch basin and street cleaning within the CSS sewershed, cleaning of trunk lines and structures and consideration of entrapment and baffling devices.

## 7). Develop and Implement Pollution Prevention Program.

The permittee shall continue to implement the pollution prevention (P2) program to reduce the impact of CSOs on receiving waters. The permittee shall maintain records to document the pollution prevention implementation activities. Specific P2 measures include street sweeping and catch basin cleaning, household hazard waste recycling program and a waste oil and antifreeze recycling/referral service program.

## 8). Public Notification.

The permittee shall continue to implement a public notification plan to inform citizens of when and where CSOs occur. The permittee shall ensure that identification signs at all CSS outfalls are maintained and easily readable by the public.

## 9). CSO Monitoring.

The permittee shall regularly monitor CSO outfalls to effectively characterize CSO impacts and the efficacy of CSO controls.

**18. Antibacksliding:**

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

**19. Effluent Monitoring Requirements:**

CSS Outfalls 001/002/003/004

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NA	NA	NA	NL	1/Q	Estimate
pH	3	NA	NA	NL S.U.	NL S.U.	1/Q	Grab
cBOD <sub>5</sub>	2	NA	NA	NA	NL mg/L	1/Q	Grab
Total Suspended Solids (TSS)	2	NA	NA	NA	NL mg/L	1/Q	Grab
Dissolved Oxygen (DO)	2	NA	NA	NL mg/L	NA	1/Q	Grab
Total Kjeldahl Nitrogen (TKN)	2	NA	NA	NA	NL mg/L	1/Q	Grab
Ammonia, as N	2	NA	NA	NA	NL mg/L	1/Q	Grab
<i>E. coli</i> *	2	NA	NA	NA	NL n/100 mL	1/Q	Grab
Oil & Grease	2	NA	NA	NA	NL mg/L	1/Q	Grab
Nitrate+Nitrite, as N	2	NA	NA	NA	NL mg/L	1/Q	Grab
Total Nitrogen**	2	NA	NA	NA	NL mg/L	1/Q	Calculated
Total Phosphorus	2	NA	NA	NA	NL mg/L	1/Q	Grab
Chlorides	2	NA	NA	NA	NL mg/L	1/Q	Grab
Zinc, Total Recoverable	2	NA	NA	NA	NL µg/L	1/Q	Grab
Copper, Total Recoverable	2	NA	NA	NA	NL µg/L	1/Q	Grab
Rainfall	2	NA	NL inches	NA	NA	1/Q	Measured
Rainfall Duration	2	NA	NL hours	NA	NA	1/Q	Recorded
Duration of Discharge	2	NA	NL hours	NA	NA	1/Q	Estimate

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards

MGD = Million gallons per day.

1/Q = Once every calendar quarter.

NA = Not applicable.

NL = No limit; monitor and report.

S.U. = Standard units.

Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

\*Report as concentration per monitored discharge event.

The CSS shall comply with the bacteria wasteload allocations assigned under the Hunting Creek Bacteria TMDL (See Section 15.a.) at Outfalls 002/003/004 as soon as possible (9VAC25-31-250.A.1.).

The schedule of compliance will be governed and enforced via the DEQ approved Long Term Control Plan Update (Section 21.d.).

\*\*Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

Each outfall shall be monitored during the following calendar year:

Year 2014 – Outfall 001; Year 2015 – Outfall 002; Year 2016 – Outfall 003; and Year 2017 – Outfall 004

Beginning in Year 2018, the permittee shall repeat the aforementioned monitoring schedule, or an alternate monitoring plan approved by DEQ, until such time a new permit is reissued.

The quarterly monitoring periods shall be January through March, April through June, July through September and October through December.

**20. Other Permit Requirements:**

- a. Permit Section Part I.B. contains quantification levels and compliance reporting instructions.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

- b. Permit Section Part I.C. details the requirements for Verification of Modeled Events.

The City of Alexandria has applied modeling software since the late 1980s to evaluate the response of the CSS to wet weather events. Several updates have been completed since early model development. The purpose of the model is to possess the ability to characterize the system in order to predict the number and amount of overflows based on the precipitation amount.

The permittee shall continue to update and calibrate as necessary the model, utilizing monitoring data, in order to ascertain the number of overflows and pollutant loadings into each receiving waters.

- c. Permit Section Part I.D. requires continuing implementation of the current Long Term Control Plan.

The permittee's Long Term Control Plan (LTCP) was approved by DEQ in February 1999. The developed LTCP consists of the nine minimum technology-based requirements of the CSO Control Policy. The permittee shall continue implementing the current approved LTCP until such time the update is approved by DEQ (Section 21.d.).

**21. Other Special Conditions:**

- a. Water Quality Criteria Reopener. The VPDES Permit Regulation at 9VAC25-31-220.D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.
- b. No New Combined Sewers Requirement. No new combined sewers shall be built outside the existing combined sewer system service areas of the City. This requirement shall not be construed to prevent the connection of new sanitary sewers to combined sewers within the existing combined sewer service area for the purpose of conveying sewage to the POTW. No new connections shall be made to the combined sewers where those connections would cause overflows during dry-weather flow conditions or exacerbate CSO events.
- c. Reopener Clause. This permit may be modified or revoked and reissued, as provided pursuant to 40 CFR 122.62 and 124.5, for the following reasons:
- 1). To include new or revised conditions developed to comply with any State or Federal law or regulation that addresses CSOs that is adopted or promulgated subsequent to the effective date of this permit.
  - 2). To include new or revised conditions if new information, not available at the time of permit reissuance, becomes available that would lead to the attainment of Virginia Water Quality Standards.
  - 3). To include new or revised conditions based on new information resulting from implementation of the long term control plan.
- d. Long Term Control Plan Update (LTCPU). The permittee shall develop a Long Term Control Plan Update (LTCPU) which will set forth an implementation plan to comply with the approved Hunting Creek Bacteria Total Maximum Daily Load (TMDL) as soon as practicable; however, no later than 31 December 2035. The LTCPU will also provide for combined sewer overflow controls to comply with all applicable water quality standards for the receiving waters (*EPA Guidance for LTCP, September 1995*), consistent with the Clean Water Act Section 402(q) and State Water Control Law. The permittee will be required to submit a LTCPU for DEQ review and approval within three (3) years of the permit effective date. A work plan outlining the schedule for developing the LTCPU will be required within nine (9) months of the permit effective date. The updated LTCP will, at a minimum, consist of measurable milestones to achieve the bacteria reductions as set forth in the aforementioned TMDL.

The City proposed a three (3) year timeline for completing the LTCPU. This allows for a value-engineered approach for mitigating the overflows while engaging all concerned parties. It also recognizes that there will be significant development and implementation of CSO control actions and measures during this permit term. Specifically, (1) green infrastructure projects will be installed and evaluated to determine effectiveness and possible incorporation into the LTCPU; (2) a sewer separation project will commence, with the ultimate goal of disconnecting ninety-two (92) sanitary connections from the combined sewer system and rerouting the flows to a separate sanitary sewer system; and (3) outfall improvements will be required with the goal of capturing additional wet weather flow. Ultimately, the permittee must obtain a reduction in bacteria loading either by at least a 5 million gallon annual reduction of stormwater entering the CSS or equivalent *E. coli* load reduction via gray and green engineering projects, during this permit term.

DEQ staff concurred that a three (3) year schedule for preparing the LTCPU is appropriate, considering that the permittee will be evaluating various alternatives to comply with the bacteria TMDL and engaging the public while concurrently completing projects that will reduce the overall amount of overflows that occur during wet weather events during the next five (5) years. The proposed conditions and requirements incorporate a regulatory framework instituting a dual approach to developing and implementing CSO controls which are complimentary to short and long term initiatives. The short term programs will achieve CSO reductions during this permit term while the long term is to ultimately achieve compliance with the Hunting Creek bacteria TMDL, including all applicable water quality standards, with the development of the LTCPU. It should be noted that the programs instituted during this permit term will also aide to inform final decisions to be incorporated into the Long Term Control Plan Update.

As discussed above, the regulatory approach incorporated into the draft permit includes both near term and long term requirements, each with associated goals and outcomes. DEQ supports this path forward as it both achieves results in the short term, while also ultimately ensuring compliance with water quality standards. Once finalized, the LTCPU will be required to be fully implemented in less than twenty (20) years in order to meet the 2035 compliance date. This proposed schedule is based upon the nature of the remaining CSS. It is recognized that the remainder of the combined sewershed occupies a relatively small drainage area compared to other systems across the nation. However, it serves a densely populated, highly developed, historic and complex area that encompasses the Old Town area of Alexandria; further presenting new challenges for the installation of controls and sewer separation. It is estimated that over the implementation period, approximately 10% of Old Town, affecting residents and businesses alike, could experience disruptions at any one time if total separation of the sanitary and storm sewers would occur. Separation projects have and may require rebuilding utilities beyond the planned sewer work. There is an extensive prevalence of underground utilities, past land uses with possible contaminants and plausible economic impacts to businesses and the City to consider while evaluating alternatives to mitigate the overflows. Furthermore, the CSS is only one part of a regional wastewater collection system involving Alexandria Renew Enterprises and a portion of Fairfax County, which will require the City to engage with these entities as viable options are evaluated since any action taken by the City would affect the system as a whole. Finally, it should be noted that the proposed timeline reflects those found in other communities that have legacy combined sewers.

Staff anticipates that sewer separation will be the primary mechanism for achieving compliance with the bacteria TMDL requirements. The LTCPU implementation schedule reflects this understanding. However, it is also recognized that ultimate compliance with water quality standards will likely entail a mutual approach to CSO controls involving technical, engineering solutions as well as integrated gray and green infrastructure. This reflects EPA's integrated approach to stormwater and wastewater permitting and planning in combined sewersheds (**Attachments 15 and 16**). It also emulates the Administrative Order for Compliance on Consent between EPA and the City of Philadelphia Water Department and the City of Philadelphia ([http://www.phillywatersheds.org/doc/EPA\\_Signed\\_%20AOCC.pdf](http://www.phillywatersheds.org/doc/EPA_Signed_%20AOCC.pdf)).

It is staff's expectation that if viable alternatives are available that would allow for a completion date prior to above, the permittee would pursue those options.

- e. **Additional Public Notification Requirements.** In addition to the requirements in Section 17.e.8., the permittee shall publish all reports on the City's combined sewer web page, notify citizens of CSO conditions semiannually and install universal pictograms at each outfall location.
- f. **Public Information Meeting.** The permittee shall conduct public informational meetings during the development of the LTCPU and prior to submitting the final for DEQ approval (Section 21.d.). These meetings shall be conducted within 18 and 36 months of the permit effective date, respectively. These meetings shall, at a minimum, explain combined sewer systems, the impacts on surface waters, progress to date on minimizing the impacts and the proposed LTCPU milestones/schedule in order to comply with the Hunting Creek TMDL.

The permittee shall conduct these meetings at such times as to maximize public participation for comments and inquiries.

- g. Funding. The permittee shall outlay a minimum of \$2,500,000 during this permit term for CSO abatement projects. The permittee shall include updates detailing fund expenditures during the previous time period and future, planned expenditures with each annual report.
- h. Stormwater and *E. coli* Loading Management. The permittee shall, at a minimum, implement the following five programs to achieve a reduction of 5 million gallons of stormwater entering the CSS, or the *E. coli* equivalent, annually by the end of this permit term. This reduction represents approximately one-half of the 2011 estimated overflow volume at Outfall 004 or 4% of the estimated annual total for the whole system.

1) Combined Sewer Service Area Reduction Plan (ARP)

The ARP, dated December 2005 (updated May 2013), requires the separation of storm and sanitary sewers associated with most development/redevelopment projects within the CSS sewershed. The permittee has been implementing this policy outside of the permit. The ARP and any future amendments are now incorporated by reference and become enforceable under this permit.

Activities associated with the ARP are dependent upon economic and market forces and are not necessarily controlled by the City; therefore, a formal schedule is not possible. Staff recognizes as redevelopment occurs, separation will be required. The ARP compliments the aforementioned LTCPU, ensuring compliance with water quality standards.

The permittee shall submit reports annually detailing ongoing and proposed redevelopment projects. If a project did not include separation, the permittee shall submit a thorough explanation within the report.

2) Green Initiative

The permittee shall study, implement and promote green infrastructure projects within the CSS sewershed during this permit term. The rationale for this special condition is to reduce the inflow of stormwater during wet weather events. This requirement does not require development/redevelopment projects; rather, the permittee shall undertake an active role in completing projects during this permit term. Projects evaluated shall include, but not limited to: rainfall harvesting, permeable pavements, rain gardens, green roof installation, bioretention cells, urban forestation/reforestation and public education.

3) Green Public Facilities

As an extension of the City's Green Building Policy and to further enhance stormwater management, the permittee shall incorporate green infrastructure into maintenance/enhancement projects at all city facilities (offices, schools, libraries etc) located within the CSS sewershed. Technologies to be considered shall, at a minimum, include those listed under the aforementioned Green Initiative. The permittee will submit proposed projects for each coming fiscal year with the annual reports.

Maintenance/enhancement projects for historic designated facilities/structures are exempt from this Special Condition.

4) Payne and Fayette Sewer Separation

Within 90 days of the permit effective date, the permittee shall submit a plan and schedule for this separation project. This project will ultimately remove ninety-two (92) sanitary sewer connections within the CSS area and reconnecting them directly to the Potomac Yard Trunk Sewer. The permittee shall complete a minimum of sixty (60) reconnections during this permit term.

The permittee shall submit progress updates with the annual reports until completion of this separation project.

5) Outfall Improvements

The permittee shall further evaluate alternatives being considered and shall submit a Preliminary Engineering Report to DEQ once the final alternative is selected. The permittee shall implement its proposed improvements at Outfall 003 and Outfall 004 within 30 months of the permit effective date. The alternatives include weir and structural enhancements to improve captured combined flows, further reduce the likelihood of dry weather overflows and facilitate maintenance.

- i. Green Maintenance. The permittee shall establish a database to manage information on all green infrastructure practices put in place that are owned and/or maintained by the City. The database shall schedule and track maintenance activities to ensure that the infrastructures are maintained for proper performance. The permittee shall submit updates within 12 and 24 months of the permit effective date concerning the development of this system. A final report shall be submitted within 36 months detailing the full database development and implementation.
  - j. Annual Loading Reporting. The permittee shall report the total estimated annual loading of *E. coli* from each outfall for each calendar year. The permittee shall utilize a combination of monitoring data along with modeling results to calculate the total estimated annual bacteria loadings into the receiving streams. The event mean concentrations (EMCs) established in the Hunting Creek Bacteria TMDL shall be utilized to compute the loadings. These EMCs may be re-evaluated if monitoring data supports updating these values. Any revised EMC values shall be documented and submitted to DEQ-NRO staff for review and approval. This reporting requirement shall be included in the annual reports.
  - k. Evaluation of Tidal Intrusion at Outfall 002. The permittee shall monitor and evaluate the tidal intrusion into the collection system at Outfall 002 as noted by the EPA inspection conducted in June 2012. The permittee shall review potential alternatives, if necessary, to minimize or eliminate the intrusion. This report will be due within 12 months of the permit effective date for DEQ review and approval.
  - l. Annual Reports. The permittee shall submit to DEQ-NRO for review and comment annual reports for the previous calendar year. These reports will be due March 31<sup>st</sup> of every year detailing the previous year's operation and maintenance of system, updates for the above projects and updates regarding the LTCPU status.
  - m. Water Quality Standards. The permittee may not discharge in excess any effluent limitations necessary to meet applicable water quality standards, including those imposed under the State Water Control Law. The conditions in this permit for the discharges from the CSS are necessary to meet the applicable water quality standards.
  - n. TMDL Reopener. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL that may be developed and approved for the receiving stream.
22. Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.
23. **Changes to the Permit from the Previously Issued Permit:**
- a. The following Special Conditions were added with this reissuance:
    - Long Term Control Plan Update (LTCPU)
    - Additional Public Notification Requirements
    - Public Information Meeting
    - Funding
    - Stormwater and *E. coli* Loading Management
    - Green Maintenance
    - Annual Loading Reporting
    - Evaluation of Tidal Intrusion at Outfall 002
    - Annual Reports
  - b. Effluent Monitoring:
    - The monitoring requirements for antimony, cadmium, chromium III, chromium VI, lead, mercury, nickel and selenium were removed. Sampling results from the past two permit terms indicate that these metals are not present in appreciable amounts.
  - c. Other:
    - Reporting requirements for rainfall and rainfall duration were included with this reissuance.
    - Ambient monitoring requirements were removed with this reissuance. The permittee has collected and reported monitoring data for Hunting Creek during the previous two (2) permit terms and concurrent monitoring of Oronoco Bay during the last permit term. This has provided a substantial amount of data that has been utilized in each subsequent reissuance and for the Hunting Creek Bacteria TMDL development.

Furthermore, since the designated use impairments have been noted for the receiving waters, additional data would not provide significant information at this time. Future permit terms may require ambient monitoring as the LTCPU is implemented.

**24. Variances/Alternate Limits or Conditions: None.**

**25. Public Notice Information:**

First Public Notice Date: 11 July 2013

Second Public Notice Date: 18 July 2013

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193; Telephone No. 703-583-3873; Douglas.Frasier@deq.virginia.gov. See **Attachment 17** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action and may request a public hearing during the comment period. Comments shall include the name, address and telephone number of the writer and of all persons represented by the commenter/requester and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be provided. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

**26. Additional Comments:**

Previous Board Action(s): None.

Staff Comments: This reissuance was delayed due to consequential discussions among the City of Alexandria, Department of Environmental Quality and Environmental Protection Agency regarding specific permit conditions and requirements in relation to the Hunting Creek Bacteria TMDL wasteload allocations and the subsequent implementation and timeframe for compliance.

Public Comment: Two organizations, Friends of Dyke Marsh and Potomac Riverkeeper, submitted comments during the public notice period; neither requested a hearing. Draft permit comments and subsequent staff responses are included in **Attachment 18**. Two citizens submitted generalized questions and comments; which, staff was able to respond satisfactorily. Email exchanges are also located in **Attachment 18**.

EPA Checklist: The checklist can be found in **Attachment 19**.

**Attachment 20** contains EPA comments and subsequent DEQ responses concerning the first EPA Region III review of the Draft permit in April 2013.



# Fact Sheet Attachments

## Table of Contents

City of Alexandria Combined Sewer System  
VA0087068  
2013 Reissuance

Attachment 1	CSS Sewershed
Attachment 2	Outfall Locations
Attachment 3	Topographic Map
Attachment 4	February 2012 DEQ Inspection Summary
Attachment 5	June 2012 EPA Inspection Report
Attachment 6	Oronoco Bay Monitoring Locations
Attachment 7	Oronoco Bay Monitoring Results
Attachment 8	Hunting Creek Monitoring Location
Attachment 9	Hunting Creek Monitoring Results
Attachment 10	Planning Statement
Attachment 11	Dissolved Oxygen Criteria for Class II Waters
Attachment 12	Outfall Monitoring Results – Parameters found above laboratory QL
Attachment 13	Water Quality Criteria / Wasteload Allocation Calculations for all Outfalls
Attachment 14	Copper and Zinc Reasonable Potential Analyses
Attachment 15	20 April 2011 EPA Memorandum
Attachment 16	27 October 2011 EPA Memorandum
Attachment 17	Public Notice
Attachment 18	Public Comments Received during Public Comment Period
Attachment 19	EPA Checklist
Attachment 20	DEQ Responses to EPA Comments concerning first review of Draft permit – April 2013

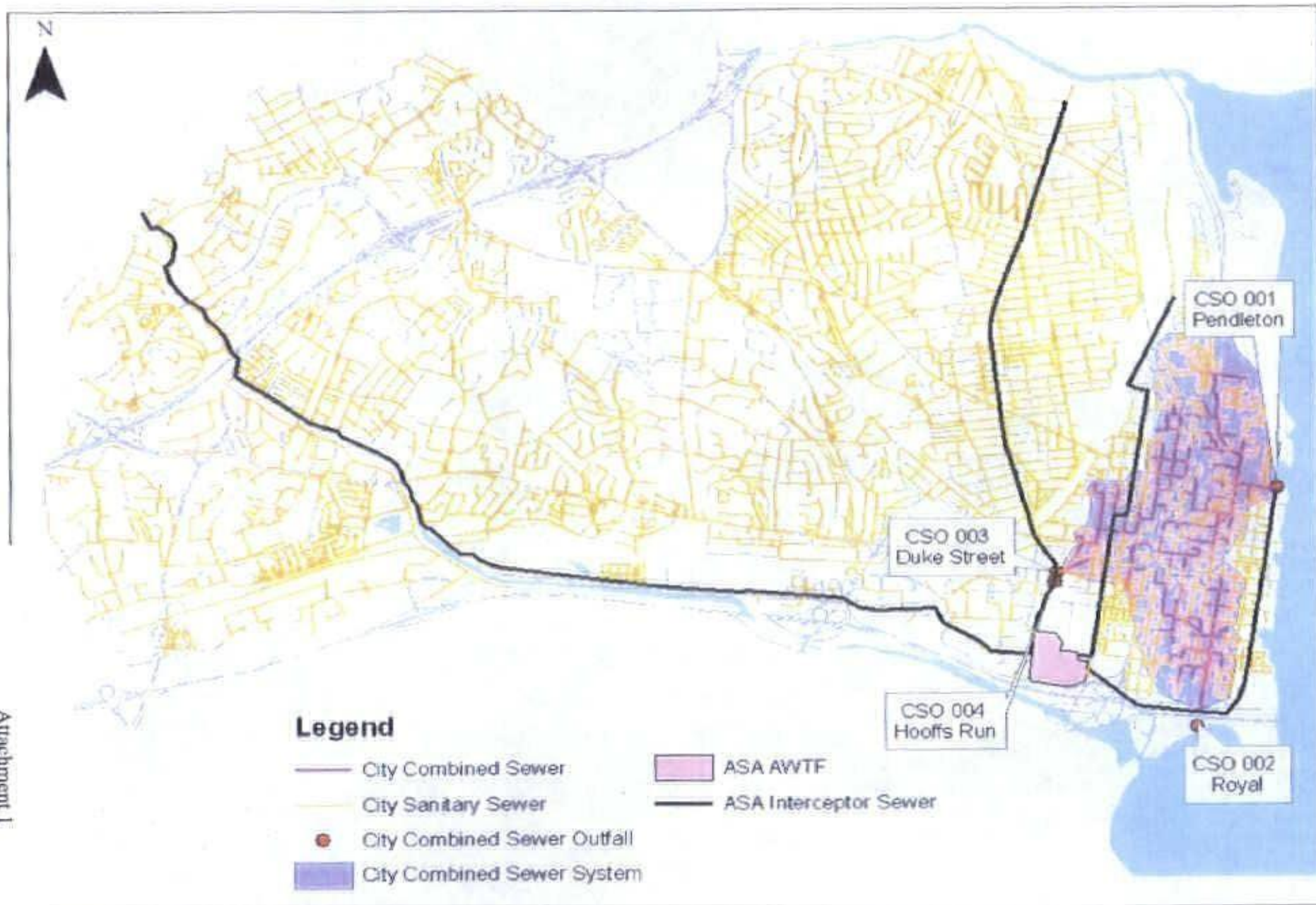
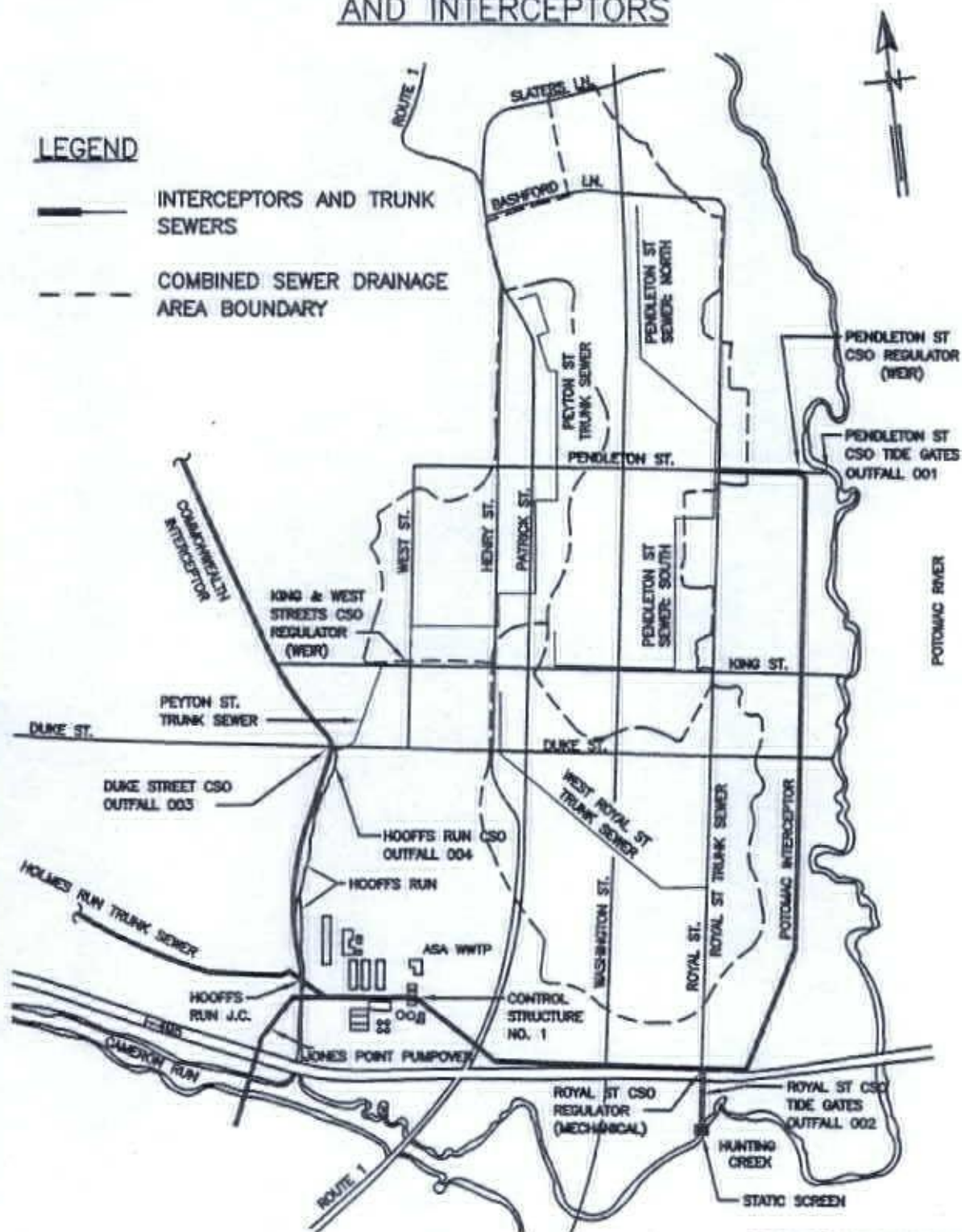


FIGURE 1

# ALEXANDRIA COMBINED TRUNK SEWERS AND INTERCEPTORS



CITY OF ALEXANDRIA  
TRANSPORTATION AND ENVIRONMENTAL SERVICES  
COMBINED SEWER SYSTEM  
2011 ANNUAL REPORT

GREELEY AND HANSEN

FILE: X:\0057C-WA Discharge\06 General Studies-Reports\06.10 CSS Annual Report\Figures\00A\_FIG-01 1:1 01/27/09 14:00 GH-9





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**INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS**

- Mr. Frasier and I met representatives for the City of Alexandria, Greeley and Hansen, and the Alexandria Sanitary Authority at City Hall in the Twin Cities conference room.
- Mr. Sharma presented a short slide presentation overview of the Combined Sewer System (CSS).
- The City of Alexandria continues to require that new developments separate wastewater and stormwater sewer lines as part of development approval. Biggest one- Potomac Yard- trunk sewer installed. New development connects to sanitary trunk sewer rather than adding to the CSS.
- New developments planned for waterfront will be connected to the Potomac Interceptor, and will not affect CSS.

**Monitoring**

- In accordance with the 2007 monitoring plan, in 2011 staff collected in-stream samples only, none from permitted outfalls.
- Samples collected by Dustin Dvorak (Greeley & Hansen) and sent to Martel Lab in Baltimore for analysis. Two samples per year are split and "QC samples" are sent to another lab to check Martel's results.
- Toured outfalls- no discharge from any.

**Outfall PS 001- Pendleton St.**

- When sample collected- take boat out to old pier pilings to collect.

**PS 002- Royal St.**

- ASA maintains regulator.
- Sewer gate is float activated based on water level in sanitary sewer.
- Some tidewater intrusion at high tide.
- Manholes have been raised and new lids installed (hydraulic so they don't come crashing down).
- Racks at overflow gate are checked and cleaned regularly, especially before and after storm events.
- Silt fence was installed above this outfall because run off from the bridge construction project was sending a lot of sediment into embayment. A lot of the silt fence is down- needs to be removed or replaced.

**PS 003 – Duke St.**

- Not observed- not observable - Confined Space.

**PS 004- Hoofs Run**

- Regulator is located in manhole in middle of Duke Street- could not observe w/out disrupting traffic.
- Some algae growth at outfall- although appears to be more of result of SW outfall just downstream from Outfall 004.



## INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

**9 Minimum Standards: I reviewed the 2010 Annual Report (submitted March 2011) for this inspection.**

Conduct Proper Operations and Regular Maintenance Programs.

- a. Designation of a Manager for the CSS: **Mr. Richard J. Baier, P.E., Director, Transportation and Environmental Services**
- b. Inspection and Maintenance of CSS.
  - i) The permittee shall ensure monthly inspection and maintenance of all outfalls, tide gates, diversion and regulator structures within the CSS. **Y**
  - ii) The permittee shall inspect each CSS outfall twice a month to confirm that no dry weather overflows are occurring. **Y**
  - iii) The permittee shall maintain records of inspections and maintenance for all aforementioned structures. **Y**
- c. Provision for Trained Staff **Y**
- d. Allocation of funds for O&M **Y**

Maximize Use of the Collection System for Storage

- a. Maintain all dams or diversion structures at or exceeding their current heights **Y**
- b. Minimize discharges from the CSS outfalls by maximizing the storage capacity **Y**
- c. Keep maintenance records **Y**

Control of Non-domestic Discharges

- a. Maintain records documenting this evaluation and implementation of the selected CSO controls to minimize CSO impacts resulting from non-domestic discharges. **Y**
- b. Requiring Significant Industrial Users (SIU) discharging to the CSS to minimize batch discharges during wet weather conditions. **The 2010 annual report states that there are no Significant Industrial Users or remediated dischargers within the CSS.**
- c. Continued control of illicit dischargers and/or improper disposal to the CSS via detection and elimination. **Illicit discharges are prohibited via city ordinances.**

Maximize Flow to POTW

- a. The City details ongoing efforts to reduce connections between the stormwater sewer and sanitary sewer as described in the annual report to DEQ. **Y. No new separation projects completed since the submission of the 2011 annual report, but there are several oo-going projects.**

Prohibit Combined Sewer Overflows during Dry Weather

- a. All dry weather overflows must be reported to DEQ and the local health department within 24 hours of when the permittee becomes aware of a dry weather overflow. **Y**  
**No dry weather overflows reported in 2010 or 2011.**
- b. Upon becoming aware of an overflow, the permittee shall begin corrective action immediately. The permittee shall monitor the dry weather overflow until the overflow has been eliminated. **Y**
- c. The permittee shall record, in the inspection log book, an estimate of the beginning and ending times of the discharge, discharge volume and corrective measures taken. **Y**



U.S. Environmental Protection Agency  
Office of Compliance and Enforcement  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

U.S. Environmental Protection Agency, Region 3  
1650 Arch Street  
Philadelphia, PA 19103

**COMBINED SEWER SYSTEM  
COMPLIANCE INSPECTION AND  
ASSESSMENT OF NINE MINIMUM CONTROLS**

**CITY OF ALEXANDRIA &  
ALEXANDRIA RENEW ENTERPRISES**

**INSPECTION REPORT**

**Inspection Dates:**

**June 26-27, 2012**

**Report Date:**

**December 27, 2012**

## CONTENTS

	Page
EXECUTIVE SUMMARY .....	1
I. INTRODUCTION .....	5
II. BACKGROUND AND GENERAL DESCRIPTION OF RESPONSIBILITIES .....	6
III. ASSESSMENT OF NINE MINIMUM CONTROLS IMPLEMENTATION.....	7
A. NMC #1 – Proper Operation and Regular Maintenance Programs for the Sewer System and the CSOs .....	7
B. NMC #2 – Maximum use of the Collection System for Storage .....	10
C. NMC #3 – Review and Modification of Pretreatment Requirements to Ensure CSO Impacts are Minimized .....	12
D. NMC #4 – Maximization of Flow to the Publicly Owned Treatment Works for Treatment .....	13
E. NMC #5 – Elimination of CSOs during Dry Weather.....	14
F. NMC #6 – Control of Solid and Floatable Materials in CSOs .....	16
G. NMC #7 – Pollution Prevention .....	16
H. NMC #8 – Public Notification to Ensure that the Public Receives Adequate Notification of CSO Occurrences and CSO Impacts .....	17
I. NMC #9 – Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls.....	18
IV. ADDITIONAL FINDINGS .....	18
A. Hooff's Run Junction Chamber has Potential for Unpermitted Discharge.....	18
B. Four Mile Run Service Chambers have Potential for an Illegal SSO Discharge .....	18

## EXHIBITS

- Exhibit 1: Summary of Field Activities  
Exhibit 2: Photograph Log

## ATTACHMENTS

- Attachment A: VPDES Permit No. VA0087068 (City)  
Attachment B: VPDES Permit No. VA0025160 (AlexRenew)  
Attachment C: Summary of Alexandria Sewer System and Combined Sewer System Permit Activities (PowerPoint Presentation dated June 27, 2012)  
Attachment D: Standard Operating Procedures (*High Flow Guidance, Overflow Monitoring at Four-Mile Run Pump Station, and Hoof Run Junction Chamber*)  
Attachment E: High Flow Report (dated September 5-10, 2011)  
Attachment F: Incident Record and Resolution Report for Four Mile Run Pump Station (incident start date September 8, 2011)  
Attachment G: Corrective Action Notice for Four Mile Run Pump Station (dated September 13, 2011)  
Attachment H: Work Orders #15555 and #15556  
Attachment I: Work Order #17682  
Attachment J: Work Order #13788  
Attachment K: Amended and Restated Service Agreement (dated October 1, 1998)  
Attachment L: Four Mile Run Pumping Station Existing Diagram



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## EXECUTIVE SUMMARY

### **City of Alexandria & Alexandria Renew Enterprises Compliance with Nine Minimum Controls for the Combined Sewer Collection and Conveyance System and Wastewater Treatment Plant**

On June 26 and 27, 2012, an inspection team comprised of staff from U.S. Environmental Protection Agency (EPA) Region 3 and Office of Enforcement and Compliance Assurance (OECA), the State of Virginia Department of Environmental Quality (VADEQ), and EPA contractor PG Environmental, LLC (hereafter, collectively, EPA Inspection Team) inspected the City of Alexandria (hereafter, City) and Alexandria Renew Enterprises (hereafter AlexRenew) combined sewer collection and conveyance system and wastewater treatment plant in Alexandria, Virginia.

The City and AlexRenew provide wastewater conveyance and treatment services to a service population of about 350,000 people within the City of Alexandria as well as unincorporated portions of Fairfax County, Virginia prior to the discharge of effluent to specific waters in the Potomac River Basin. AlexRenew is responsible for the operation and maintenance of the AlexRenew Water Resource Recovery Facility (WRRF), pump stations, interceptors, and combined sewer overflow (CSO) regulators and tide gates. AlexRenew is also the responsible party for the management and implementation of the industrial pretreatment program (IPP). The City is responsible for the operation and maintenance of the collection system mains.

The primary purpose of the inspection was to evaluate the City's and AlexRenew's compliance with the Nine Minimum Controls (NMCs) for the combined sewer system (CSS) as described in EPA's 1994 National Combined Sewer Overflow (CSO) Control Policy and the EPA guidance document titled *Guidance for Nine Minimum Controls* (EPA 832-B-95-003), dated May 1995. As required by Part I, Section E of Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0087068 (hereafter, Permit), the City must continue implementation of the NMCs as part of its long-term control plan (LTCP; approved by DEQ in February 1999) and maintain records to demonstrate compliance with the LTCP. A copy of the City Permit is included as Attachment A. AlexRenew's activities are regulated under VPDES Permit No. VA0025160 (administratively extended). A copy of the AlexRenew Permit is included as Attachment B.

The EPA Inspection Team held discussions with City and AlexRenew staff, conducted field verification activities in the collection system and at the WRRF, and obtained pertinent documentation regarding the City's and AlexRenew's implementation of the NMCs. A summary of field activities is included as Exhibit 1.

The EPA Inspection Team noted several observations. These observations are summarized in Table 1.

**Table 1. Summary of NMCs and Observations**

NMC	Observations
<p>NMC # 1 – Proper operation and regular maintenance programs for the sewer system and CSO outfalls.</p>	<ol style="list-style-type: none"> <li>1. According to City staff, intrusion is often observed at the Royal Street Regulator for CSO 002 during weekly inspections. Observations such as time, intrusion flow rate, sewer capacity are not being recorded.</li> <li>2. Based on a comparison of a wet weather event and the AlexRenew standard operating procedures (SOPs), system overflow conditions are not properly documented or inspected in accordance with the current SOPs. AlexRenew's SOPs state that the Four Mile Run Pump Station assets will overflow if the detention tank level reaches 13 feet. At numerous times on September 8 and 9, 2011, the detention tank overflowed at levels between 12.15 and 12.33 feet.</li> <li>3. A review of the AlexRenew team's High Flow Report dated September 5–10, 2011 identified a number of "Event/Occurrence" entries on September 8, 2011 between 1820 and 2100* concerning flooding, sewer backups, and surcharging.</li> </ol>
<p>NMC # 2 – Maximum use of the collection system for storage.</p>	<ol style="list-style-type: none"> <li>1. The City and AlexRenew do not have a structured approach to evaluate the weir heights within the CSS to maximize storage of wastewater flows in the system.</li> <li>2. The City and AlexRenew do not have any records or documentation stating the current status of additional storage available within the system.</li> <li>3. City representatives stated that Fairfax County is not required to conduct inflow and infiltration (I/I) assessments or to reduce I/I, which reduces the potential for storage in the system.</li> <li>4. The current position and structure of the Hooff's Run Junction Chamber makes this asset vulnerable to flooding and minimizes collection system storage capacity. This junction chamber has been documented to be submerged during wet weather events. The available documentation does not state how much stream water was flowing into the sewer system and reducing system storage capacity.</li> <li>5. Intrusion into the conveyance system was observed at CSO 002 during the inspection. Intrusion reduces storage in the collection system.</li> </ol>
<p>NMC # 3 – Review and modification of pretreatment requirements to ensure CSO impacts are minimized.</p>	<ol style="list-style-type: none"> <li>1. The Royal St. Bus garage is up gradient of CSO 001; however, the facility has not been evaluated for or directed to make any changes specifically related to reducing or eliminating process water discharges during or after wet weather events to minimize impacts on CSO.</li> </ol>
<p>NMC # 4 – Maximization of flow to the publicly owned treatment works for treatment.</p>	<ol style="list-style-type: none"> <li>1. The Four Mile Run Pump Station had a pumping capacity of 11.4 million gallons per day (mgd); however, its associated force main had a maximum capacity of 9.4 mgd. The capacity of the force main limits maximization of flow to the treatment plant and places higher demand on the stations storage capacity.</li> <li>2. Intrusion into the conveyance system was observed at CSO 002 during the inspection. Intrusion limits AlexRenew's ability to maximize the conveyance of flow to the WRRF for treatment.</li> <li>3. Evaluations of wet weather events document a number of times when unpermitted discharges were made out of the Four Mile Run Pump Station while the pump station was pumping less than its design flow capacity.</li> <li>4. The City does not maintain records to document that they conveyed all wet weather flows to the Publicly Owned Treatment Works (POTW) within the constraints of the CSS and the capacity of the POTW.</li> </ol>
<p>NMC # 5 – Elimination of CSOs during dry weather.</p>	<ol style="list-style-type: none"> <li>1. Dry weather overflows (DWOs) have occurred at CSOs in the conveyance system. The City reported the occurrence of six DWOs in 2009.</li> </ol>

**Table 1. Summary of NMCs and Observations**

NMC	Observations
NMC # 8 – Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts.	1. The EPA Inspection Team observed two discharge locations without signage. One of the discharge locations was reported to be a CSO and the other was a constructed sanitary sewer overflow (SSO).

\*NOTE: AlexRenew's records and documentation use a 24-hour clock notation. To maintain consistency, that same notation is used here.

**ADDITIONAL OBSERVATIONS**

- 1) An unpermitted CSO structure was observed at the Hooff's Run Junction Structure, which had the potential to discharge directly into Hooff's Run. Based on a review of the two sewer lines flowing into this junction structure, one sanitary sewer line and one currently defined as a combined sewer line, it appeared that this structure serves as both a CSO and as a constructed SSO.
- 2) A constructed SSO structure was observed at the Four Mile Run Pump Station. This structure has the potential to discharge into Four Mile Run from the pump station's service chambers and the wet weather storage tanks.

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## I. INTRODUCTION

On June 26 and 27, 2012 a compliance inspection team comprised of staff from Environmental Protection Agency (EPA) Region 3 and Headquarters, Virginia Department of Environmental Quality (DEQ) and EPA contractor, PG Environmental, LLC, inspected the City of Alexandria (City) and Alexandria Renew Enterprises (hereafter AlexRenew, formerly the Alexandria Sanitation Authority) combined sewer collection system and wastewater treatment plant in Alexandria, Virginia. The purpose of the inspection was to evaluate the City's and AlexRenew's compliance with the Nine Minimum Controls (NMCs) for the combined sewer system (CSS) as described in EPA's 1994 National Combined Sewer Overflow (CSO) Control Policy and EPA's guidance document titled *Guidance for Nine Minimum Controls (EPA 832-B-95-003)*, dated May 1995. As required by Part I, Section E of VPDES Permit No. VA0087068 (hereafter, Permit), the City must continue implementation of the NMCs as part of its long-term control plan (LTCP; approved by DEQ in February 1999) and maintain records to demonstrate compliance with the LTCP.

The compliance inspection included the following major activities:

- Discussions with representatives from the City and AlexRenew regarding the operation of the sewer collection system, wastewater treatment plant, permitted CSOs, and the industrial pretreatment program (IPP).
- A physical inspection of AlexRenew Water Resource Recovery Facility (WRRF).
- A physical inspection of four CSOs and their associated control structures (see Exhibit I for a summary of field activities).
- Evaluation of AlexRenew's operational procedures for the WRRF and the interceptor/trunk sewer system during wet weather events.
- Verification of the City's and AlexRenew's adherence to the requirements for implementation of the NMCs as outlined in Virginia Pollutant Discharge Elimination System (VPDES) permit (VA0087068) issued January 17, 2007.

Section III of this report summarizes the observations and findings of the inspection. Section IV identifies additional findings noted during the inspection.

The following personnel were involved in the inspection:

City of Alexandria:

Lalit Sharma, Division Chief - Environmental Quality  
Yon Lambert, Deputy Director - Operations  
Emily Baker, City Engineer  
Jesse Maines, Senior Environmental Specialist  
Erin Bevis-Carver, Civil Engineer III  
Jeremy Hassan, Water Quality Compliance Specialist

Alexandria Renew Enterprises:

Jim Sizemore, Quality Manager  
Adrienne Fancher, Chief Operating Officer  
Rickie Everette, Chief Plant Operator  
Ron Allen, Plant Superintendent  
Jeff Duval, Engineering Manager  
Joel Gregory, Process Manager  
Larry Cable, General Lead

City Consultant: Clyde Wilber, Principal, Greeley and Hansen

Virginia Department of  
Environmental Quality: Douglas Frasier, VPDES Permit Writer  
Sharon Allen, Water Compliance Inspector

EPA Representatives: Steve Maslowski, EPA Region 3  
Matthew Colip, EPA Region 3  
James Zimny, Headquarters

EPA Contractor: Danny O'Connell, PG Environmental, LLC  
Jake Albright, PG Environmental, LLC

## II. BACKGROUND AND GENERAL DESCRIPTION OF RESPONSIBILITIES

The City of Alexandria and portions of Fairfax County discharge wastewater to the City's collection system and WRRF. About 5 percent of the City's sewer system is combined and about 95 percent is separate. The flows from Fairfax County account for approximately 55 percent of the total flow in the collection system on a daily basis (Fairfax County is permitted a maximum 60 percent share of the system). The City is approximately 15 square miles with a population of about 142,000. The population of the total service area, including the contributing municipalities, is about 350,000. Average daily flow to the WRRF is approximately 35 million gallons per day (mgd). The design flow of the WRRF is 54 mgd.

The City conducted a PowerPoint presentation (Attachment C) for the EPA Inspection Team on June 27, 2012. The presentation outlined the City's (and AlexRenew's) responsibilities for the collection system.

The City's Transportation and Environmental Services (T&ES) operates and maintains the collection system within the City except for the interceptor sewers which are owned and operated by AlexRenew. The City owns all four CSOs, but the CSOs are maintained by AlexRenew (i.e., tide gates and regulators for CSOs 001, 002, 003, and 004). AlexRenew also owns and operates the pump stations and wet weather storage vaults within the City, as well as a plant flow regulator near the CSO 002 control weir.

The Permit authorizes discharges from the WRRF and four CSO locations within the conveyance system. The CSOs are permitted to discharge to the Oronoco Bay, Hunting Creek Embayment, or Hooff's Run, which are all located in the Potomac River Basin. The Permits also include requirements and other conditions regarding the operation and maintenance of the WRRF, the industrial pretreatment program, and management and control of the CSOs. Table 2 summarizes AlexRenew's interceptor sewers.

Table 2. Summary of AlexRenew's Interceptor Sewers		
Interceptor Name	Size Range (inches)	Approx. Length (miles)
Holmes Run	30-72	6.4
Commonwealth	27-72	3.2
Potomac	36-42	2.4
Potomac Yard	24-30	1.6

### III. ASSESSMENT OF NINE MINIMUM CONTROLS IMPLEMENTATION

#### A. NMC #1 – Proper Operation and Regular Maintenance Programs for the Sewer System and the CSOs

Section E.1 of the Permit requires the permittee to “Conduct Proper Operations and Regular Maintenance Programs.” Section E.1 states:

*The permittee shall continue to implement the operation and maintenance plan for the Combined Sewer System (CSS) that includes the elements listed below. The permittee shall update the plan to incorporate any changes to the system and shall operate and maintain the system accordingly. The permittee shall maintain records to document the implementation of the plan.*

Section E.1 of the Permit further requires:

- a. *Designation of a Manager for the CSS. The permittee shall designate a person to be responsible for the wastewater collection system and serve as the contact person regarding the CSS.*
- b. *Inspection and Maintenance of CSS.*
  - i. *The permittee shall ensure monthly inspection and maintenance of all outfalls, tide gates, diversion and regulator structures within the CSS.*
  - ii. *The permittee shall inspect each CSS outfall twice a month to confirm that no dry weather overflows are occurring.*
  - iii. *The permittee shall maintain records of inspections and maintenance for all aforementioned structures.*
- c. *Provision for Trained Staff. The permittee shall continue to ensure the availability of trained staff to complete the operation, maintenance, repair and testing functions required to comply with the terms and conditions of this permit. Each staff member shall receive appropriate training and all training shall be documented and updated annually.*
- d. *Allocation of funds for O&M. The permittee shall allocate adequate funds specifically for operation and maintenance activities. The permittee shall submit a certification of assurance with the annual report that the necessary funds, equipment and personnel have been committed to carry out the O&M plan for the next fiscal year.*

As stated in EPA’s *Guidance for Nine Minimum Controls*:

“The first minimum control, proper operation and regular maintenance of the CSS and CSO outfalls, should consist of a program that clearly establishes operation, maintenance, and inspection procedures to ensure that a CSS and treatment facility will function in a way to maximize treatment of combined sewage and still comply with NPDES permit limitations.”

According to EPA’s guidance document, a Proper Operation and Maintenance (O&M) Program generally should include the following:

- The organization and people responsible for various aspects of the O&M program.
- Resources (i.e., people and dollars) allocated to O&M activities.
- Planning and budgeting procedures for O&M of the CSS and treatment facilities.
- List of the facilities (e.g., tide gates, overflow weirs) critical to the performance of the CSS.



- Written procedures and schedules for routine, periodic maintenance of major items of equipment and CSO diversion facilities, as well as written procedures to ensure that regular maintenance is performed.
- A process for periodic inspections of the facilities listed previously.
- Written procedures, including procurement procedures if applicable, for responding to emergency situations.
- Policies and procedures for training O&M personnel.
- A process for the periodic review and revision of the O&M program.

The EPA Inspection Team made the following observations:

During the inspection of the Royal Street Regulator for CSO 002, the EPA Inspection Team observed intrusion from the Hunting Creek Embayment into the collection system. When questioned about whether this is common, City representatives responded that intrusion is often observed during weekly inspections of the regulator. However, these observations and field variables, including times, intrusion flow rate, sewer capacity, height of freeboard on weir wall, are not being documented or recorded. Refer to Exhibits 1 and 2 for a description and photograph (refer to Photograph 4) of the asset.

- 1) The AlexRenew team has developed a number of operational standard operating procedures (SOPs) to support normal and regularly experienced operational conditions. Attachment D contains copies of the SOPs reviewed for this component of the inspection process. The inspection team reviewed three SOPs, *High Flow Guidance*, *Overflow Monitoring at Four-Mile Run Pump Station*, and *Hoof Run Junction Chamber*.

The SOPs contained requirements to capture the critical information needed to describe the operational procedure. The City did not consistently document operational variables such as inspection times, flows, or document comments that described the operational status of the sewer structures being observed.

Specific examples were observed in the entries made on September 8, 2011 at 2010 for the Four Mile Run Pump Station (FMR) and the collection system. (NOTE: AlexRenew's records and documentation use a 24-hour clock notation. To maintain consistency, that same notation is used here.) These entries contain different plant flow rates for the same time. Another example is the entry made for September 9, 2011 at 2300, which, based on flow comparisons, appears to have the wrong date.

In addition, the operations team does not inspect or document the wet well and/or overflow weir heights during periods of peak asset demand and stress (e.g. September 7 at 1600 and 2300; September 8 at 0300, 0923, and 2010) during the September 5 – 10, 2011 wet weather event. The SOP required monitoring every 20 minutes. In addition, a number of the log entries for the FMR pump station did not contain data sets for the station pump or flow rates (e.g. September 7 at 1600 and 2300; September 8 at 0300). Without regular observations of the overflow weirs and the station's pump rates, it was not possible to know if the station was discharging or if the City was maximizing flows to the WRRF or storage within the collection system.

AlexRenew generated an internal *Incident Record and Resolution Report* (Attachment F) that stated, “the Four Mile Run pump station overflowed on three separate occasions from 7:00 am on September 8 to 4:40 am on September 9, 2011.” FMR data entries made on September 8, 2011 include:

- 0300: “detention tank level 9.16.”
- 0705: “detention tank discharge flow was 14 inches over weir wall detention tank level 13.15.”

There was a four-hour time lapse when no inspections or observations were conducted at the FMR overflow weirs leaving the actual overflow start time unknown.

The AlexRenew team conducted its own evaluation of this event. This activity was documented in the AlexRenew Corrective Action Notice (CAN) (see Attachment G). The CAN stated that SOPs were not followed. The AlexRenew team conducted a root-cause analysis of the September wet weather event as a component of the CAN process.

Two observations were made: the AlexRenew team 1) did not monitor overflows; and 2) did not document the operational observations of variables made during the inspection or monitoring activities. The CAN identified both short- and long-term actions to ensure future compliance. The long-term actions included the revision and update of SOPs, training on the updated SOPs, and the development of log sheets to record overflows.

The CAN did not review or discuss issues associated with the overflow heights observed during the event or the heights stated as “approximate” in the SOP. The approximate height stated for the detention tank to start overflowing is 13 feet. There are multiple data entries during the event that document the detention tank level at 12.15 feet, yet there is flow over the weir from the detention tank. Based on information contained in the event report, the EPA Inspection Team estimated that there are operational conditions and variables that create overflows of the detention tank at levels well below 13 feet.

- 2) A review of the AlexRenew team’s *High Flow Report* dated September 5–10, 2011 identified a number of “Event/Occurrence” entries on September 8, 2011 between 1820 and 2100 concerning flooding, sewer backups, and surcharging. The inspection team found no associated work orders (WOs) for these “Event/Occurrence” entries in the data provided. Two WOs for September 9, 2011 (#15555 and #15556, Attachment H) were located.

The City responded to the WOs 3 and 11 days, respectively, after the residents’ calls concerning sewer backups. Both WOs documented that the sewer main was flowing at the time of the service inspection. WO #15556 stated that “signs of a surcharge in the manhole at the corner of Donelson Street and the service road” were found.

In some instances, the City responded to sewer backups 3 and 11 days after being informed of an unpermitted discharge. Based on the information available, the EPA Inspection Team noted that sewage backups into residences were occurring within the City and not being reported to the state or the EPA.

A search of the WOs received by the inspection team did find a WO (#17682, Attachment I) for one of the addresses documented in the *High Flow Report*, 104 East Monroe Avenue. This WO was for another backup that occurred on December 9, 2011.

It took the City seven days to respond to the WO. The “City did install a backflow preventer in the manhole at the rear of the property” to stop the surcharge from the sewer main. There was no record of any illegal sewer discharges reported for this address.

On July 14, 2011, a WO (#13788, Attachment J) was created for “raw sewage” backup “through entire court yard area/parking lot.” The WO states that the line was not inspected or serviced until March 27, 2012.

**B. NMC #2 – Maximum use of the Collection System for Storage**

Section E.2 of the Permit requires the permittee to “Maximize Use of the Collection System for Storage.” Section E.2 of the Permit states:

*The permittee shall maximize the in-line storage capacity of the CSS. The permittee shall maintain records to document implementation.*

- a. Maintain all dams or diversion structures at or exceeding their current heights (as of effective date of permit).*
- b. Minimize discharges from the CSS outfalls by maximizing the storage capacity provided by the dams and diversion structures; allowing for later treatment at the POTW.*
- c. Keep maintenance records for the dams or diversion structures and activities dealing with sewer blockages.*

As stated in EPA’s *Guidance for Nine Minimum Controls*:

“As the second minimum control, maximum use of the collection system for storage means making relatively simple modifications to the CSS to enable the system itself to store wet weather flows until downstream sewers and treatment facilities can handle them.”

EPA’s guidance document provides several examples of simple control measures that can be implemented to increase the storage capacity of a CSS. These measures include the following:

- Inspecting collection system to identify deficiencies which restrict storage capacity of the system (e.g., sediment build up in sewer lines, undersized pipe).
- Maintaining and repairing tide gates to eliminate leaking.
- Adjusting regulator settings to maximize weir heights for increased storage within the sewer system.
- Retarding inflows by using special gratings or hydrobrakes in catch basins to restrict rate at which surface runoff is permitted into the system.
- Using localized upstream detention for short-term storage (e.g., upstream parking area usage for temporary water storage).
- Upgrading or adjusting pump operations at interceptor lift stations to increase pump rates if downstream sections have available hydraulic capacity.
- Removing obstructions to flows (e.g., sediment accumulation or other debris).

EPA Inspection Team noted the following observations:

- 1) The City and AlexRenew did not have a structured approach to evaluate the weir heights within the CSS to maximize storage of wastewater flows in the system. City representatives indicated that CSOs 003 and 004 may have been evaluated within the past 20 years.
- 2) The City and AlexRenew did not have any records or documentation stating the current status of additional storage available within the system.
- 3) City representatives stated that Fairfax County was not required to conduct inflow and infiltration (I/I) assessments or to reduce I/I. Fairfax County owns a majority share in the WRRF capacity. Below is a description of the joint use agreement between the City and Fairfax County.

The *Amended and Restated Service Agreement* (Agreement; Attachment K) became effective on October 1, 1998. The Agreement is a joint use service arrangement that gives Fairfax County a 60 percent (maximum) share in the capacity of the WRRF as well as share in two other joint use facilities, the Commonwealth Interceptor and the Holmes Run Trunk Sewer. Conversely, the City has a 40 percent share; it can use its entire share or lease to other municipalities if desired. City representatives stated that there are flow sensors on the interceptors where the Fairfax County system discharges into the City's system. Monitoring data is used for billing purposes in addition to capacity control.

Table 3 below describes the joint use facilities and the share owned by Fairfax County as obtained from the Agreement.

<b>Table 3. Fairfax County Share of Joint Use Facilities</b>	
<b>Facility</b>	<b>Fairfax County Share (maximum possible)</b>
<b>AlexRenew WRRF</b>	32.4 mgd maximum average monthly flow (60 percent of Permit authorized design flow (54.0 mgd)) 64.8 mgd maximum daily quantity
<b>Commonwealth Interceptor</b>	
<i>Hooff's Run Junction Chamber to the connection for the County's Jones Point Pumpover</i>	57.7 mgd
<i>Jones Point Pumpover connection to the WRRF</i>	64.8 mgd
<b>Holmes Run Trunk Sewer</b>	
<i>From the City-County boundary to the original Cameron Station connection</i>	18.9 mgd
<i>From the original Cameron Station connection to MH 30 on the 1976 WAMATA relocation</i>	42.7 mgd
<i>From MH 30 on the 1976 WAMATA relocation to MH 17 on the 1976 WAMATA relocation</i>	67.7 mgd

<i>From MH 17 on the 1976 WAMATA relocation to Hooff's Run Junction Chamber</i>	57.7 mgd
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- 4) Hooff's Run Junction Chamber was documented as being submerged during wet weather events.

According to AlexRenew's *High Flow Report* for September 5 – 10, 2011 (Attachment E), the Hooff's Run Junction Chamber was reported as being submerged on September 8, 2011 at 2000. The top of the structure was reported to be visible again at 2300 on September 8, 2011, and the middle of the structure was reported visible at 0100 on September 9, 2011. The available documentation does not state how much stream water was flowing into the sewer system and reducing system storage capacity.

- 5) Intrusion into the conveyance system was observed at CSO 002 during the inspection. Refer to Section III.A.1 of this report for additional details on the intrusion at this location.

**C. NMC #3 – Review and Modification of Pretreatment Requirements to Ensure CSO Impacts are Minimized**

Section E.3 of the Permit requires the "Control of Non-domestic Discharges." Section E.3 of the Permit states:

*The permittee shall continue to implement selected CSO controls to minimize the impact of non-domestic discharges. The permittee shall coordinate with the Alexandria Sanitation Authority in the control of industrial users and whether additional modifications to its pretreatment program are necessary.*

Section E.3 continues by stating that control shall contain the following:

*Control of non-domestic users shall also include the following:*

- a. Maintain records documenting this evaluation and implementation of the selected CSO controls to minimize CSO impacts resulting from non-domestic discharges.*
- b. Requiring Significant Industrial Users (SIU) discharging to the CSS to minimize batch discharges during wet weather conditions.*
- c. Continued control of illicit dischargers and/or improper disposal to the CSS via detection and elimination.*

As stated in EPA's *Guidance for Nine Minimum Controls*:

"Under the third minimum control, the municipality should determine whether nondomestic sources are contributing to CSO impacts and, if so, investigate ways to control them. The objective of this control is to minimize the impacts of discharges into CSSs from nondomestic sources (i.e., industrial and commercial sources, such as restaurants and gas stations) during wet weather events, and to minimize CSO occurrences by modifying inspection, reporting, and oversight procedures within the approved pretreatment program."

EPA's guidance document provides the following steps for municipalities to implement the third NMC:

- Inventory nondomestic discharges to the CSS, including the identification of discharge locations on a map of the system.
- Assess the impact of nondomestic discharges on the CSOs and receiving waters.
- Assess the value and feasibility of modifications to the existing pretreatment program's approach of regulating nondomestic users to reduce the impact on CSO discharges.

EPA Inspection Team noted the following observations:

- 1) The Royal Street Bus garage is upgradient of CSO 001 and the Pendleton Street Regulator. The facility has not been directed to make any changes related to reducing or eliminating process water discharges during or after wet weather events. Based on the information available during the inspection it was unclear if the facility was located within the combined or the recently separated sewer area.

AlexRenew is responsible for the IPP; however, the City owns and operates the collection system and manages the stormwater program. If this facility is in a combined sewer area the IPP team should evaluate possible operational changes (e.g. storage of concentrated wastewaters) during wet weather events to minimize impact on the CSO system.

**D. NMC #4 – Maximization of Flow to the Publicly Owned Treatment Works for Treatment**

Section E.4 of the Permit requires the permittee to "Maximize Flow to POTW." Section E.4 of the Permit states:

*The permittee shall convey, to the greatest extent practicable, all wet weather flows to the POTW within the constraints of the CSS and the capacity of the POTW. The POTW is owned, operated and maintained by Alexandria Sanitation Authority and is regulated under a separate VPDES permit (VA0025160). The permittee shall maintain records to document these actions.*

As stated in EPA's *Guidance for Nine Minimum Controls*:

"The fourth minimum control, maximizing flow to the POTW, entails simple modifications to the CSS and treatment plant to enable as much wet weather flow as possible to reach the treatment plant. The objective of this minimum control is to reduce the magnitude, frequency, and duration of CSOs that flow untreated into receiving waters."

EPA's guidance document provides the following measures for municipalities to implement the fourth NMC:

- Determine the capacity of the major interceptor(s) and pump station(s) and ensure that full capacity is available.
- Analyze records comparing flows processed at the WRRF during wet and dry weather to determine relationships between performance and flow.
- Compare current flows with the design capacity of the overall facility, as well as the capacity of individual process units to identify available excess capacity.
- Determine the ability of the facility to operate acceptably at incremental increases in wet weather flows and estimate impacts on compliance.
- Determine whether any inoperative or unused treatment facilities on the POTW site can be used to store or treat wet weather flows.

- Develop cost estimates for any planned physical modifications and any additional O&M costs at the treatment plant due to the increased wet weather flow.

EPA Inspection Team noted the following observations:

- 1) The Four Mile Run Pump Station had a pumping capacity of 11.4 mgd; however, its associated force main had a maximum capacity of 9.4 mgd, limiting the storage able to be provided by the collection system. The main, a 24-inch force main, conveys flow to the Commonwealth Interceptor.

City and AlexRenew representatives stated that the Four Mile Run Pump Station is equipped with two service chambers adding approximately 1.05 million gallons of capacity to the pumping station. Upon a field inspection of these service chambers, the EPA Inspection Team found that these chambers had the potential to overflow and cause an SSO discharge into Four Mile Run during wet weather events. A more detailed explanation of these chambers can be found in Section IV.B of this report.

- 2) Intrusion into the conveyance system was observed at CSO 002 during the inspection.

According to City representatives who perform routine inspections of the CSO 002 weir, intrusion is typically observed at the location, but it is not recorded in the observation log. The EPA Inspection Team recommended that the City and AlexRenew evaluate the impacts of the intrusion on the CSS and WRRF during dry and peak flows. Refer to Section III.A.1 of this report for additional details on the intrusion at this location.

- 3) The EPA Inspection Team evaluated AlexRenew's *High Flow Report* for September 5-10, 2011 (Attachment E). The report documented a number of times when unpermitted discharges were occurring from the Four Mile Run Pump Station while the pump station was pumping less than its designed flow capacity.

At 0705 on September 8, 2011, AlexRenew reported that the Four Mile Run detention tank was discharging 14 inches over the weir wall. The reported pump station flow at the time was 7.21 mgd. As discussed previously, the pump station's capacity is 11.4 mgd and the 24-inch force main's capacity is 9.4 mgd. The *High Flow Report* for this event indicates that the discharge lasted until approximately 1015. The Four Mile Run detention tank was also reported to be discharging at "2430" on September 9, 2011. (The correct time is believed to have been 12:30am on September 9, 2011.) The pump station had a flow of 6.94 mgd at this time. The detention tank was reported to still be discharging at 4:30am on September 9, 2011 (flow reported as 6.33 mgd). The Four Mile Run Pump Station and service chambers were reported to be unclogged at 8:30am on September 9, 2011. No further discharges were reported at this location during the September 5-10, 2011 wet weather event.

A detailed flow schematic of the Four Mile Run Pump Station, service chambers, and detention tank can be found in Attachment L.

- 4) The City does not maintain records to document that they conveyed all wet weather flows to the Public Owned Treatment Works (POTW) within the constraints of the CSS and the capacity of the POTW.

**E. NMC #5 – Elimination of CSOs during Dry Weather**

Section E.5 of the Permit requires the permittee to "Prohibit Combined Sewer Overflows during Dry Weather." Section E.5 of the Permit states:

*Inspection Dates: June 26-27, 2012*

*Dry weather overflows from CSS outfalls are prohibited. Dry weather flow conditions shall mean the flow in a combined sewer that results from sanitary sewage, industrial wastewater and infiltration/inflow; with no contribution from storm water runoff or storm water induced infiltration. Wet weather flow condition shall mean the flow in a combined sewer including storm water runoff and/or storm water induced infiltration. Documentation required during dry weather CSO events are as follows:*

- a. *All dry weather overflows must be reported to DEQ and the local health department within 24 hours of when the permittee becomes aware of a dry weather overflow.*
- b. *Upon becoming aware of an overflow, the permittee shall begin corrective action immediately. The permittee shall monitor the dry weather overflow until the overflow has been eliminated.*
- c. *The permittee shall record, in the inspection log book, an estimate of the beginning and ending times of the discharge, discharge volume and corrective measures taken.*

As stated in EPA's *Guidance for Nine Minimum Controls*:

"The fifth minimum control, elimination of CSOs during dry weather, includes any measures taken to ensure that the CSS does not overflow during dry weather flow conditions. Since the NPDES program prohibits dry weather overflows (DWOs), the requirement for DWO elimination is enforceable independent of any programs for the control of CSOs."

EPA's guidance document states that "a visual inspection program of sufficient scope and frequency is needed to provide reasonable assurance that any occurrence will be detected." The document also provides several examples of actions to alleviate DWOs caused by operational issues. Examples of these corrective actions include adjustment of regulator settings, maintenance and repair of regulators, maintenance of tide gates, interceptor cleaning, and sewer repair.

EPA Inspection Team noted the following observations:

- 1) According to the City's PowerPoint presentation (Attachment C), dry weather overflows (DWOs) occurred at CSOs in the conveyance system. The City reported the occurrence of six DWOs in 2009. Table 4 below describes each event as reported by the City.

<b>Date</b>	<b>Location</b>	<b>Cause</b>	<b>Follow-up Action</b>
5/10/09	CSO 003	Captured metering data	Increased inspection for a period. None observed.
7/17/09	CSO 003	Captured metering data	Increased inspection for a period. None observed.
8/19/09	CSO 004	During pump around for interceptor rehabilitation	Contractor instructed to lower level in manhole; discharge lasted about 15 minutes.
8/20/09	CSO 004	During pump around for interceptor rehabilitation	Pump around procedures modified and discharge stopped. Lasted about 20 minutes.
8/20/09	CSO 004	Siphon clogged	Crew cleaned the siphon and discharge lasted less than 2 hours.



**Table 4. Summary of Reported DWOs**

Date	Location	Cause	Follow-up Action
8/28/09	CSO 004	During pump around for interceptor rehabilitation	Contractor directed to lower elevation in the wet well and discharge reduced, yet not stopped due to intense, sporadic rainfall. Not able to estimate duration of DWO.

**F. NMC #6 – Control of Solid and Floatable Materials in CSOs**

Section E.6 of the Permit requires “Control Solid and Floatable Materials.” Section E.6 of the permit states:

*The permittee shall implement measures to control solid and floatable materials in the CSS. Such measures shall include:*

- a. Regular catch basin and street cleaning within the CSS sewershed.*
- b. Cleaning of the trunk lines and structures to prevent accumulation of solids.*
- c. Consideration of entrapment and baffling devices to reduce discharges of solids and floatable materials.*

As stated in EPA’s *Guidance for Nine Minimum Controls*:

“The sixth minimum control is intended to reduce, if not eliminate, visible floatables and solids using relatively simple measures. Simple devices including baffles, screens, and racks can be used to remove coarse solids and floatables from combined sewage, and devices such as booms and skimmer vessels can help remove floatables from the surface of the receiving water body.”

EPA’s guidance document provides schematics and a more thorough description of possible modifications and devices that can be used to control and remove solids and floatables from combined sewage.

**G. NMC #7 – Pollution Prevention**

Section E.7 of the Permit requires the permittee to “Develop and Implement Pollution Prevention Program.” Section E.7 of the Permit states:

*The permittee shall continue to implement the pollution prevention (P2) program to reduce the impact of CSOs on receiving waters. The permittee shall maintain records to document the pollution prevention implementation activities. Specific P2 measures include:*

- a. Street sweeping and catch basin cleaning at an appropriate frequency to prevent large accumulations of pollutants and debris.*
- b. A public education program that informs the public of the City's household hazard waste recycling program.*
- c. A waste oil and antifreeze recycling/referral service program.*

As stated in EPA’s *Guidance for Nine Minimum Controls*:

“The seventh minimum control, pollution prevention, is intended to keep contaminants from entering the CSS and thus receiving waters via CSOs[...]The objective of this minimum control is to reduce to the greatest extent possible the amount of contaminants that enter the CSS.”

EPA’s guidance document provides information regarding measures such as street cleaning, public education, solid waste collection, product ban/substitution, hazardous waste collection, and recycling as actions which can be taken to prevent contaminants from entering the CSS.

**H. NMC #8 – Public Notification to Ensure that the Public Receives Adequate Notification of CSO Occurrences and CSO Impacts**

Section E.8 of the Permit requires the permittee to provide “Public Notification.” Section E.8 of the Permit states:

*The permittee shall continue to implement a public notification plan to inform citizens of when and where CSOs occur.*

Section E.8 of the Permit further states that the process must include:

- a. A notice to alert persons using all affected receiving water bodies. The permittee shall ensure that identification signs at all CSS outfalls are maintained and easily readable by the public.*
- b. The permittee shall maintain records documenting public notification.*

As stated in EPA’s *Guidance for Nine Minimum Controls*:

“The intent of the eighth minimum control, public notification, is to inform the public of the location of CSO outfalls, the actual occurrences of CSOs, the possible health and environmental effects of CSOs, and the recreational or commercial activities (e.g., swimming and shellfish harvesting) curtailed as a result of CSOs.”

EPA’s guidance document provides the following measures for notifying the public about CSO events:

- Posting at affected use areas.
- Posting at selected public places.
- Posting at CSO outfalls.
- Notices in newspapers or on radio and TV news programs.
- Letter notification to affected residents.
- Telephone hot line for interested citizen calls.

EPA Inspection Team noted the following observations:

- 1) The EPA Inspection Team observed two unpermitted overflow locations that also did not have signage. The unpermitted overflow locations were observed at Hooff’s Run and Four Mile Run. City representatives stated that these locations did not have signage. Observations made by the EPA Inspection Team during visits to both locations on June 26, 2012 confirmed that signage informing the public of a discharge location was not present.

**I. NMC #9 – Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls**

Section E.9 of the Permit requires the permittee to conduct a “Long-Term Control Plan Review.” Section E.9 of the Permit states:

*The permittee shall review the Long-Term Control Plan (LTCP) annually for compliance with water quality standards, minimization of overflows and impacts from overflows. Any changes shall be submitted to the Department of Environmental Quality Northern Regional Office.*

As stated in EPA’s *Guidance for Nine Minimum Controls*:

“The ninth minimum control involves visual inspections and other simple methods to determine the occurrence and apparent impacts of CSOs. This minimum control is an initial characterization of the CSS to collect and document information on overflow occurrences and known water quality problems and incidents, such as beach or shellfish bed closures, that reflect use impairments caused by CSOs.”

EPA’s guidance document states that a municipality should characterize its system (obtain maps of CSS, locations of CSO outfalls, etc.), record the occurrence of overflows (via visual inspection, inspection aids, or automatic measurement), and record and summarize information on water quality or usage of the CSO receiving waters.

**IV. ADDITIONAL FINDINGS**

**A. Hoooff’s Run Junction Chamber**

The EPA Inspection Team conducted a site visit at the Hoooff’s Run Junction Chamber on June 26, 2012. During an inspection of the structure, it was found that the chamber had the potential to discharge during a high flow event; however, the structure is not a permitted CSO under VPDES Permit No. VA0087068.

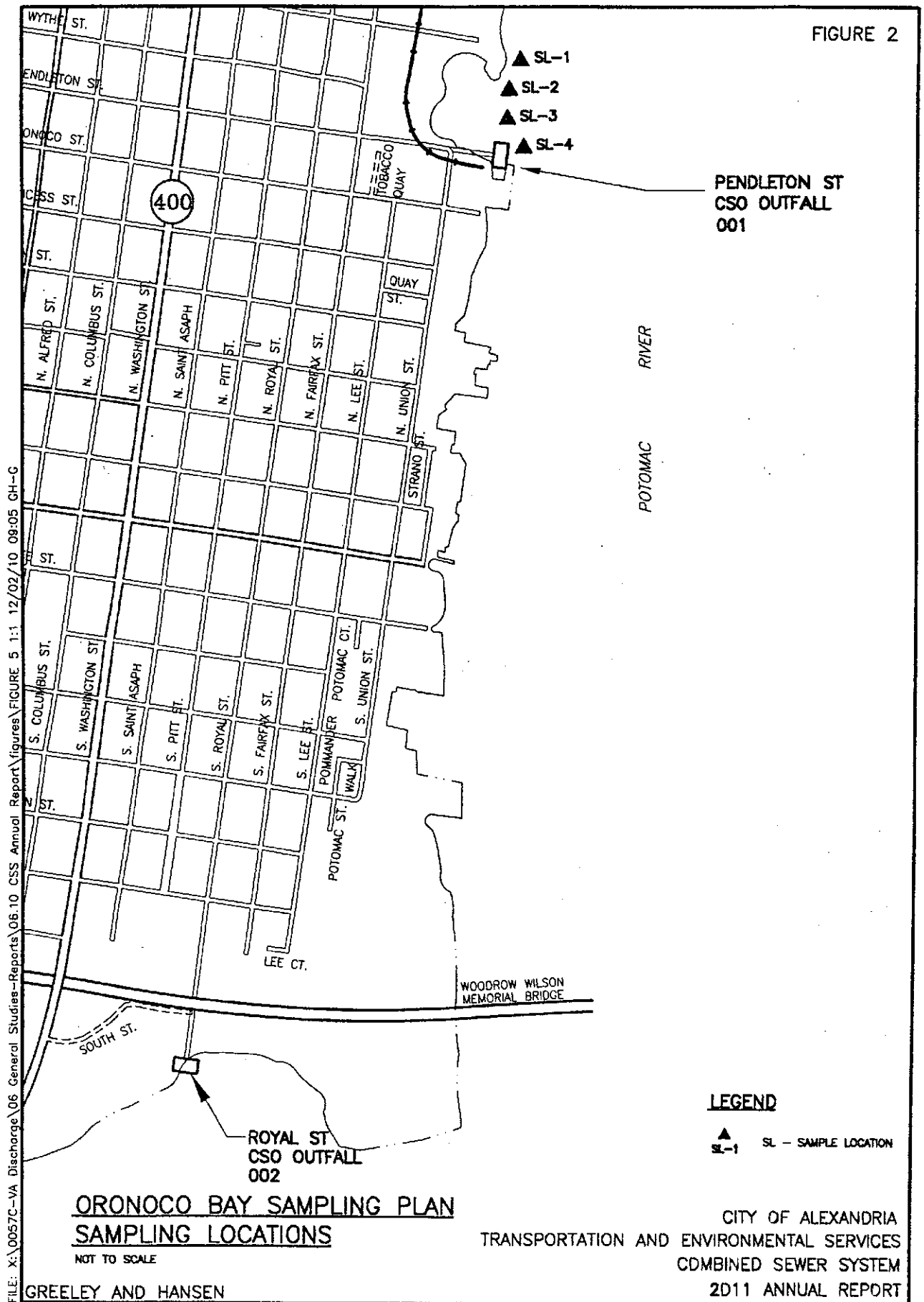
The structure is designed to receive flow from the Commonwealth Interceptor and the Holmes Run Trunk Sewer and direct it to the WRRF. The Commonwealth Interceptor is reported to be a combined sewer asset, while the Holmes Run Trunk Sewer is a sanitary sewer asset. The EPA Inspection Team found that the structure had engineered overflow gates near the top of the chamber which would allow an overflow directly into Hoooff’s Run during a significant high flow event. Photographs 2 and 3 illustrate the position of the overflow gates in the Hoooff’s Run Junction Chamber. City representatives stated that they were aware of the structure’s potential to discharge into Hoooff’s Run. This junction chamber functions as both an unpermitted CSO and a constructed SSO. Refer to Exhibits 1 and 2 of this report for a description of and photographs from the site visit.

**B. Four Mile Run Service Chambers**

The EPA Inspection Team conducted a site visit at the Four Mile Run Pump Station and Service Chambers on June 26, 2012. During an inspection of the structures, the EPA Inspection Team found that the chambers had the potential to discharge during high flow events. The Four Mile Run Pump Station and Service Chambers are located on the north end of the Commonwealth Interceptor.

The chambers are designed to provide added storage capacity for the Four Mile Run Pump Station. As stated above, the pumping capacity for the station is 11.4 mgd while the capacity of the 24-inch force main is only 9.4 mgd. The service chambers are able to store an added 1.05 million gallons in a high flow event. If a high flow event exceeds the capacity of the force main and the storage chambers, sanitary sewer flow has the potential to overflow the service chamber into Four Mile Run. Refer to Section III.D.3

of this report for details on a past unpermitted discharge event. A schematic of the Four Mile Run Pump Station and Service Chambers can be found in Attachment L. Also, refer to Exhibits 1 and 2 of this report for a description of and photographs from the site visit.



# APPENDIX C: OROMOCO BAY SAMPLING RESULTS

APPENDIX C: OROONOK BAY SAMPLING RESULTS																																	
Routine or CSO	Last CSO Event (days)	Sample ID	Field Data				Laboratory Data (container numbers listed below)														#7 - µg/L										#8 - µg/L	#10 - µg/L	
			Date (yy/mm/dd)	SL SL1-SL4	Measurements Taken From Sampling Container	Hardness mg/L CaCO3	#1 - MPN/100 mL	#2 - mg/L	#3 - mg/L P or N	#4 - mg/L	#5 - mg/L N	#6 - mg/L N	Antimony	Cadmium	Cr III	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc	Cr VI	Oil/Grease									
			Time	Temp (°C)	pH	DO - mg/L	Fecal C	E. Coli	Total Coliform	GBOD5	TP	TKN	TSS	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N																	
Routine	>1	070912	SL1	9:30 AM	26.7	7.18	5	200	500	130	1600	<3.0	0.063	1.2	14	<0.10	0.81	0.043	<5.0	<0.50	3.4	2.8	<2.0	<0.20	<4.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070912	SL2	9:52 AM	27.3	7.19	3.87	200	75	75	1600	<3.0	0.061	0.9	9	<0.10	0.73	0.044	<5.0	<0.50	3.3	2.7	<2.0	<0.20	<4.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070912	SL3	10:05 AM	27.3	7.14	5.54	250	1600	350	>1600	<3.0	0.064	1.3	16	<0.10	1	0.044	<5.0	<0.50	3.3	2.7	<2.0	<0.20	<4.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070912	SL4	10:25 AM	27	7.3	5.65	200	900	280	900	<3.0	0.062	1.1	12	<0.10	<0.050	<0.043	<5.0	<0.50	1.2	3.8	<2.0	<0.20	<4.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070917	SL1	8:47 AM	21.6	7.37	8.75	240	110	110	170	<3.0	0.079	1.2	23	0.3	0.72	0.043	<5.0	<0.50	<2.5	2.2	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070917	SL2	9:10 AM	22.1	7.06	8.57	200	130	130	300	<3.0	0.077	1.1	22	0.38	0.72	0.044	<5.0	<0.50	<2.5	2	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070917	SL3	9:15 AM	22.5	7.29	6.54	250	80	80	130	4.3	0.074	1.4	23	0.31	0.78	0.045	<5.0	<0.50	<2.5	2	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070917	SL4	9:25 AM	22.6	7.45	8.55	250	240	240	300	<3.0	0.25	1.4	17	0.29	0.79	0.045	<5.0	<0.50	<2.5	2	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070918	SL1	8:54 AM	22.7	7.88	6.76	240	130	130	230	3.6	0.088	0.68	20	0.44	0.78	0.065	<5.0	<0.50	<2.5	3	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070918	SL2	9:03 AM	22.3	7.8	6.86	240	230	230	230	5.4	0.081	0.98	13	0.25	0.72	0.06	<5.0	<0.50	<2.5	3	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070918	SL3	9:16 AM	22.5	7.77	6.61	220	230	230	230	3.6	0.056	0.53	11	0.14	0.75	0.046	<5.0	<0.50	<2.5	2.9	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070918	SL4	9:24 AM	22.3	7.56	6.62	240	300	300	300	<3.0	0.057	0.81	10	0.3	0.76	0.051	<5.0	<0.50	<2.5	2.9	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070924	SL1	8:25 AM	24.2	7.74	7.42	86	230	230	230	<3.0	0.073	0.74	29	<0.10	1.1	0.041	<5.0	<0.50	<2.5	3.5	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070924	SL2	8:40 AM	24.1	7.74	7.27	95	220	220	220	<3.0	0.078	0.58	25	<0.10	1	0.041	<5.0	<0.50	<2.5	3.3	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070924	SL3	8:50 AM	24	7.79	7.47	94	170	130	170	<3.0	0.068	0.52	21	<0.10	1	0.041	<5.0	<0.50	<2.5	3.3	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070924	SL4	9:02 AM	24	7.62	6.77	100	230	230	300	<3.0	0.045	0.85	11	<0.10	0.97	0.047	<5.0	<0.50	<2.5	2.3	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070926	SL1	8:14 AM	24.2	7.74	6.58	140	230	130	230	<3.0	0.043	0.3	19	<0.10	1.1	0.047	<5.0	<0.50	<2.5	2.1	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070926	SL2	8:26 AM	24.4	7.78	6.73	140	270	270	800	<3.0	0.041	0.12	14	<0.10	1	0.044	<5.0	<0.50	<2.5	2.1	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070926	SL3	8:37 AM	24.3	7.78	6.67	140	300	300	300	<3.0	0.06	0.43	14	<0.10	1.2	0.047	<5.0	<0.50	<2.5	2.2	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	070926	SL4	8:48 AM	24.2	7.69	6.85	130	230	230	230	<3.0	0.042	0.8	11	<0.10	1.2	0.047	<5.0	<0.50	<2.5	2.2	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071001	SL1	8:29 AM	23.1	7.91	6.98	140	500	500	500	<3.0	0.088	1.9	42	<0.13	1.1	0.076	<5.0	<0.50	<2.5	2.8	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071001	SL2	8:48 AM	23	7.86	7.2	140	5,000	3,000	8,000	<3.0	0.079	<0.10	27	<0.10	1.1	0.043	<5.0	<0.50	<2.5	2.4	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071001	SL3	8:56 AM	23.2	7.78	7.32	140	500	500	500	<3.0	0.079	<0.10	27	<0.10	1.1	0.043	<5.0	<0.50	<2.5	2.4	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071001	SL4	8:29 AM	23.3	7.81	7.04	140	300	300	300	<3.0	0.057	0.27	17	0.25	1.1	0.042	<5.0	<0.50	<2.5	2.5	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071003	SL1	8:26 AM	24	7.8	6.94	150	2400	2400	2400	<3.0	0.054	1.4	11	<0.12	1.3	0.058	<5.0	<0.50	<2.5	4.4	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071003	SL2	8:40 AM	23.9	7.78	6.89	140	1700	1700	1700	<3.0	0.054	0.17	3.5	<0.11	1.2	0.057	<5.0	<0.50	<2.5	3.8	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071003	SL3	8:49 AM	23.7	7.87	6.83	140	2400	2400	2400	<3.0	0.056	0.33	11	0.16	1.1	0.051	<5.0	<0.50	<2.5	3.8	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071003	SL4	8:57 AM	23.7	7.9	6.79	130	500	500	500	<3.0	0.064	3.3	18	<0.12	1.1	0.055	<5.0	<0.50	<2.5	3.8	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071008	SL1	8:57 AM	25.8	7.91	6.98	140	700	700	700	<3.0	0.072	1.1	27	<0.12	1.1	0.048	<5.0	<0.50	<2.5	4.4	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071008	SL2	8:10 AM	25.2	7.73	6.84	140	500	500	500	<3.0	0.065	1.2	12	<0.12	1.1	0.069	<5.0	<0.50	<2.5	4.1	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071008	SL3	9:17 AM	25.7	7.69	6.31	140	700	700	700	<3.0	0.08	1.1	14	<0.11	1.1	0.049	<5.0	<0.50	<2.5	3.8	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
Routine	>1	071008	SL4	9:26 AM	25.1	7.84	5.61	140	300	300	300	<3.0	0.06	1.2	11	<0.11	1	0.049	<5.0	<0.50	<2.5	3.8	<2.0	<0.20	<5.0	<5.0	<1.0	<2.0	<5.0	<5.0	<5.0		
CSO	1	071028	SL1-1	13:20	18.4	7.84	8.28	N/A	16,000	5,000	16,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
CSO	1	071028	SL1-2	15:25	18.1	7.57	8.08	N/A	>16,000	>16,000	>16,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071028	SL1-3	5:14	18.8	9.44	8.3	N/A	2200	2200	5000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071028	SL1-4	13:30	18.1	7.87	8.4	N/A	9000	9000	>16,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A										

## APPENDIX C: ORONOCO BAY SAMPLING RESULTS

Routine or CSO event	Last CSO Event (days)	Sample ID Date	SL	Field Data				Hardness mg/L CaCO3	Laboratory Data (container numbers listed below)																				mg/L EPA 1684	
				Measurements Taken From Sampling Container in Field					mg/L																µg/L					
				Time	Temp (°C)	pH	DO - mg/L		SM 8221E Fecal C.	SM 8221B E. Coli	SM 8221B Total Coliform	SM 5210B CBOD5	mg/L P or N EPA 365.1 TP	mg/L P or N EPA 361.2 TN	mg/L SM 2540D TSS	mg/L N SM 4500NH3-G NH3-N	mg/L N EPA 353.2 NO3-N	mg/L N EPA 353.2 NO2-N	EPA 200.6 Antimony	EPA 200.6 Cadmium	EPA 200.6 Cr III	EPA 200.6 Copper	EPA 200.6 Lead	EPA 200.6 Mercury	EPA 245.1 Nickel	EPA 200.8 Selenium	EPA 200.8 Silver	EPA 200.8 Zinc		Cr VI
Routine	>1	04/23/08	SL1	10:22 AM	16.6	6.08	MP	113	500	500	500	3.4	0.028	1.30	28.0	0.25	0.82	0.027	<5.0	<1.0	<10.0	2.8	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	04/23/08	SL2	10:37 AM	16.1	5.75	MP	84	1,600	1,600	1,600	3.9	0.026	1.10	23.0	<10.0	0.82	0.062	<5.0	<1.0	<10.0	2.3	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	04/23/08	SL3	10:45 AM	16.6	5.87	MP	95	300	300	1,600	3.6	0.030	1.30	28.0	<10.0	0.79	0.019	<5.0	2.6	<10.0	5.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	04/23/08	SL4	10:54 AM	16.4	6.11	MP	80	200	200	1,600	3.6	0.030	1.30	<10.0	<10.0	0.82	0.027	<5.0	<1.0	<10.0	2.3	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	04/30/08	SL1	10:31 AM	19.4	6.41	9.56	90	<20,000	<20,000	<20,000	6.3	<0.010	0.87	23.0	0.11	0.16	0.025	<5.0	<1.0	<10.0	3.6	<5.0	<2.0	<4.0	<5.0	<20.0	13.0	<5.0	<5.0
Routine	>1	04/30/08	SL2	10:42 AM	27.7	7.10	5.71	68	20,000	20,000	20,000	<5.0	<0.010	0.87	23.0	0.11	0.16	0.025	<5.0	<1.0	<10.0	3.3	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	5.6	<5.0
Routine	>1	04/30/08	SL3	10:52 AM	26.4	7.22	6.51	94	<20,000	<20,000	<20,000	<5.0	<0.010	0.56	27.0	0.26	0.39	0.024	<5.0	<1.0	<10.0	3.1	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	04/30/08	SL4	11:04 AM	27.7	6.68	6.44	68	20,000	20,000	<20,000	<5.0	<0.010	0.81	16.0	<10.0	0.39	0.026	<5.0	<1.0	<10.0	2.9	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/05/08	SL1	10:22 AM	29.3	8.56	10.90	60	1,300	1,300	2,500	<5.0	0.047	0.46	20.0	0.14	1.20	0.016	<5.0	<1.0	<10.0	2.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/05/08	SL2	10:30 AM	27.0	7.93	10.33	78	200	200	800	<5.0	0.039	0.32	21.0	<10.0	1.10	0.017	<5.0	<1.0	<10.0	2.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/05/08	SL3	10:40 AM	29.6	6.58	11.63	64	200	200	800	<5.0	<0.010	0.37	11.0	<10.0	1.10	0.016	<5.0	<1.0	<10.0	1.9	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/05/08	SL4	10:52 AM	30.6	6.36	10.90	80	200	200	800	<5.0	<0.010	0.32	<10.0	<10.0	1.20	0.016	<5.0	<1.0	<10.0	1.9	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/07/08	SL1	10:20 AM	31.4	8.55	8.81	76	400	400	400	<5.0	0.034	0.66	9.0	0.29	1.10	0.018	<5.0	<1.0	<10.0	1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/07/08	SL2	10:30 AM	32.2	8.85	8.81	86	<200	<200	<200	<5.0	0.039	0.50	5.5	0.18	1.20	0.016	<5.0	<1.0	<10.0	1.3	<5.0	<2.0	<4.0	<5.0	<20.0	5.3	<5.0	<5.0
Routine	>1	05/07/08	SL3	10:40 AM	35.0	7.23	8.68	90	200	200	200	<5.0	0.063	0.63	12.0	<10.0	1.20	0.015	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/07/08	SL4	10:52 AM	23.1	6.73	9.02	84	200	200	200	<5.0	0.042	0.82	<5.0	<10.0	1.20	0.014	<5.0	<1.0	<10.0	1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/14/08	SL1	11:30 AM	19.2	6.77	10.60	70	24,000	9,800	24,000	4.4	0.097	1.00	62.0	0.24	<0.060	0.017	<5.0	<1.0	<10.0	2.2	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/14/08	SL2	11:46 AM	31.5	6.70	12.00	68	13,000	6,800	24,000	5.6	0.100	0.38	45.0	0.21	0.67	0.016	<5.0	<1.0	<10.0	2.1	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/14/08	SL3	12:51 PM	32.5	6.51	12.50	55	13,000	21,000	21,000	4.1	0.110	0.38	26.0	0.21	0.69	0.018	<5.0	<1.0	<10.0	2.2	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/14/08	SL4	12:18 PM	24.6	6.70	11.49	55	13,000	13,000	15,000	4.1	0.090	0.32	31.0	0.22	0.69	0.017	<5.0	<1.0	<10.0	2.1	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/19/08	SL1	11:47 AM	22.4	6.87	1.017	87	1,100	1,100	3,300	<5.0	0.031	0.50	11.0	<10.0	1.30	0.016	<5.0	<1.0	<10.0	1.6	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/19/08	SL2	12:02 PM	30.2	6.58	10.22	84	200	200	2,300	<5.0	0.032	0.47	16.0	0.24	1.30	0.014	<5.0	<1.0	<10.0	1.6	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/15/08	SL3	12:12 PM	26.1	6.46	6.70	70	1,300	1,300	5,000	<5.0	0.029	0.44	16.0	<10.0	1.30	0.014	<5.0	<1.0	<10.0	1.7	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/15/08	SL4	12:22 PM	29.2	6.7	6.90	73	200	200	2,300	<5.0	0.028	0.46	17.0	0.36	1.20	0.015	<5.0	<1.0	<10.0	1.4	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/22/08	SL1	10:33 AM	17.1	6.55	9.37	71	200	200	1,300	<5.0	0.014	0.52	13.0	<10.0	1.20	0.012	<5.0	<1.0	<10.0	1.5	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/22/08	SL2	10:42 AM	16.8	6.67	8.65	20	>200	200	2,300	<5.0	0.026	0.46	21.0	<10.0	1.20	0.012	<5.0	<1.0	<10.0	1.4	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/22/08	SL3	10:50 AM	16.7	6.86	9.37	71	200	200	2,300	<5.0	0.010	0.47	20.0	<10.0	1.20	0.012	<5.0	<1.0	<10.0	1.4	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/22/08	SL4	11:01 AM	15.7	6.52	9.37	74	200	200	2,300	<5.0	0.056	0.47	20.0	<10.0	1.20	<0.012	<5.0	<1.0	<10.0	1.2	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
Routine	>1	05/27/08	SL1	10:45 AM	16.8	7.66	14.74	62	400	400	1,300	<2.0	<0.010	0.50	11.0	0.56	1.20	<0.012	<5.0	<1.0	<10.0	1.1	<5.0	<2.0	<4.0	<5.0	0.29	<10.0	<5.0	<5.0
Routine	>1	05/27/08	SL2	3:55 PM	16.5	6.69	14.20	60	400	400	2,300	<2.0	<0.010	0.49	7.0	0.42	1.20	<0.012	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	0.29	<10.0	<5.0	<5.0
Routine	>1	05/27/08	SL3	11:10 AM	19.6	6.77	14.25	78	200	200	200	<2.0	0.220	0.41	8.2	0.45	1.20	0.012	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	0.70	<10.0	<5.0	<5.0
Routine	>1	05/27/08	SL4	11:29 AM	21.0	6.74	12.75	80	400	400	400	<2.0	<0.010	0.43	8.2	0.50	1.10	0.013	<5.0	<1.0	<10.0	1.3	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
CSO event	1	04/29/08	SL1	11:02 AM	16.6	6.54	9.56	<20,000	<20,000	<20,000	20,000	<5.0	<0.010	<5.0	<10.0	<10.0	<1.0	<1.0	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
CSO event	1	04/29/08	SL1-2	12:36 PM	16.9	6.59	9.56	<20,000	<20,000	<20,000	<20,000	<5.0	<0.010	<5.0	<10.0	<10.0	<1.0	<1.0	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
CSO event	1	04/29/08	SL1-3	2:12 PM	19.4	6.52	MP	<20,000	<20,000	<20,000	<20,000	<5.0	<0.010	<5.0	<10.0	<10.0	<1.0	<1.0	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
CSO event	1	04/29/08	SL1-4	2:12 PM	19.4	6.52	MP	<20,000	<20,000	<20,000	<20,000	<5.0	<0.010	<5.0	<10.0	<10.0	<1.0	<1.0	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
CSO event	1	04/29/08	SL2-1	11:37 AM	18.8	6.47	6.79	<20,000	<20,000	<20,000	20,000	<5.0	<0.010	<5.0	<10.0	<10.0	<1.0	<1.0	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
CSO event	1	04/29/08	SL2-2	12:50 PM	16.1	6.48	10.63	<20,000	<20,000	<20,000	20,000	<5.0	<0.010	<5.0	<10.0	<10.0	<1.0	<1.0	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
CSO event	1	04/29/08	SL2-3	2:17 PM	19.0	6.31	MP	<20,000	<20,000	<20,000	20,000	<5.0	<0.010	<5.0	<10.0	<10.0	<1.0	<1.0	<5.0	<1.0	<10.0	<1.0	<5.0	<2.0	<4.0	<5.0	<20.0	<10.0	<5.0	<5.0
CSO event	1	04/29/08	SL3-1</																											

Note  
Sampling analytical testing conducted by Microbac Laboratories, Inc.  
SLE Sample Location - Refer To Figure 4.  
MP = Measurement Problem DO Probe Malfunction - DO Probe after recalibrated in field and/or DO membrane replaced following sampling.  
1 = CSD within 24 Hours  
+1 = No CSD within last 24 Hours  
CSD = number of events collected within 24 hours of activation.

## APPENDIX D: CROMOKO RAY SAMPLING RESULTS

[illegible]

Note:  
Sampling analytical testing conducted by Ivertek Laboratories, Inc.  
6 = Sample Location Abate To Figure 4.  
1 = CSO within 24 Hours  
2 = No CSO within last 24 Hours  
CSO event samples collected within 24 hours of CSO activation.  
If holding time has been exceeded, additional follow up samples were collected.  
1 = Follow up sample



#### APPENDIX C: ORIONCORERAY RANSOMING RESULTS

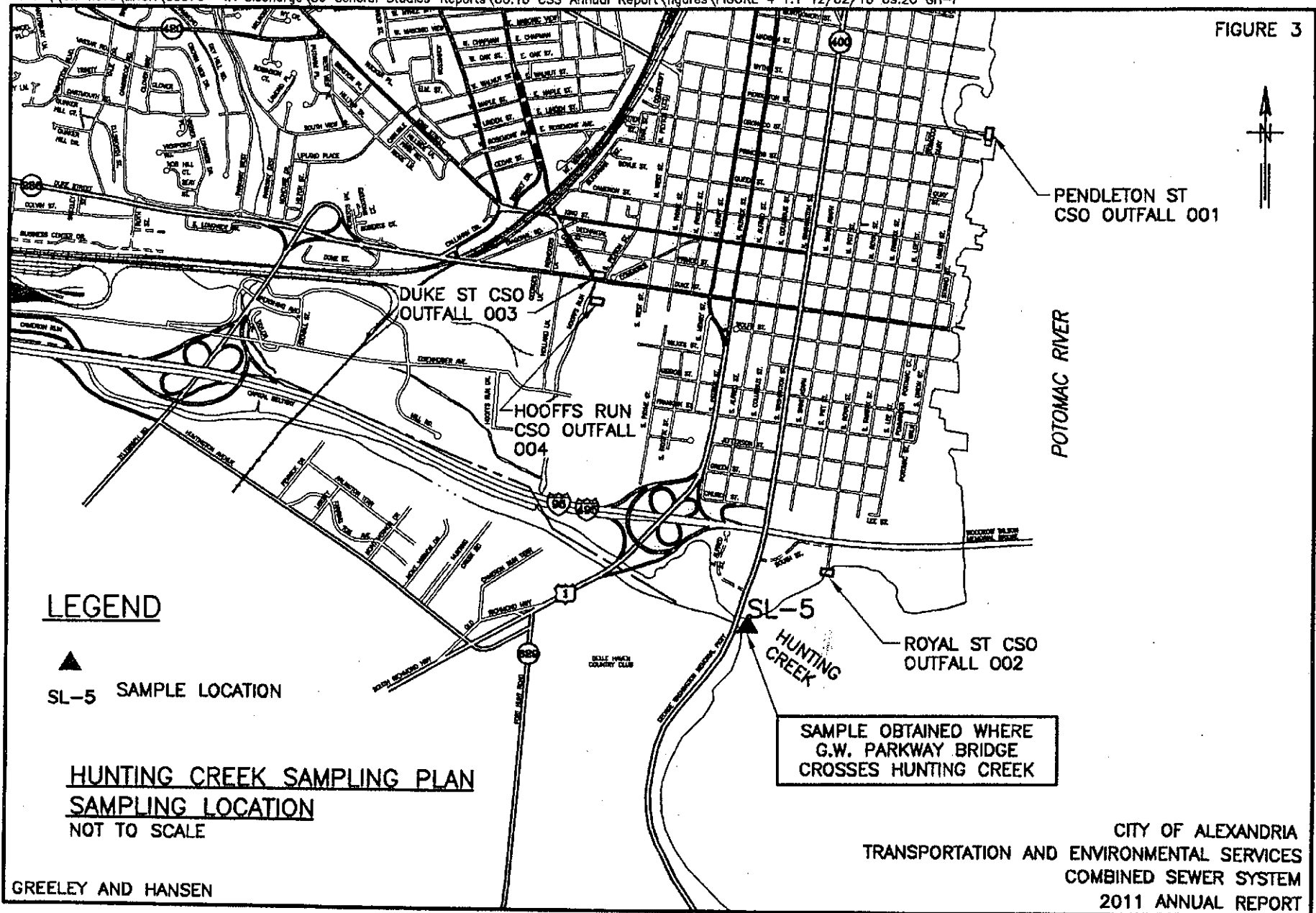
[illegible]

Notes:  
Sampling analytical testing conducted by Metrol Laboratories, Inc.  
BL = Sample Location Relative To Figure 4  
1 = CBO within 24 Hours  
>1 = No CBO within last 24 Hours  
CBO = 4 more samples collected within 24 hours of CBO collection  
1 = Holding time has been exceeded, additional within up samples were collected  
2 = Following sample

APPENDIX B: ORONOCHO BAY SAMPLING RESULTS

Routine or CSO event	Last CSO Event (mm/dd/yyyy)	Sample ID Date	Field Data				Hardness SM 2340 C mg/L CaCO3	Laboratory Data (container numbers listed below)																							
			SL	Measurements Taken From Sampling Container in Field				mg/L																							
				Time	Temp (°C)	pH		DO - mg/L	SM 9221E	SM 9221B	SM 9210B	EPA 385.1	P or N EPA 351.2	mg/L SM 2540D	SM 4500NH3-G	EPA 353.2	EPA 353.2	SM 4500NO3-H	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 245.1	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	mg/L SM 3500 CR D	EPA 1664A
Facial C.	E. Coli	Total Coliform	CBOOD	TP	TKN	TSS	NH3-N	NO3-N	NO2-N	NO3-N	NO3-N	Antimony	Cadmium	Cr III	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc	Cr VI	Oil/Grease								
Routine	>24 hrs	063011	SL-1-1	9:40 AM	25.9	8.96	8.46	150	17	14	200	2	0.1	1.1	14	<0.2	0.07	0.03	1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	063011	SL-2-1	9:50 AM	26.3	8.96	8.51	150	22	17	800	2	0.11	0.8	12	0.3	0.07	0.03	1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	063011	SL-3-1	10:00 AM	27.0	8.75	8.58	150	40	22	800	1	0.15	1.1	10	<0.2	0.08	0.02	1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	063011	SL-4-1	10:05 AM	27.0	8.75	8.38	150	80	22	500	1	0.12	0.8	13	<0.2	0.08	0.02	1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	070711	SL-1-1	9:40 AM	28.6	8.78	8.23	120	240	240	300	<1	0.16	1.7	13	0.2	1.10	0.03	1.1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	070711	SL-2-1	9:50 AM	28.7	8.98	8.54	130	30	23	900	3	0.15	1.8	11	0.4	1.2	0.03	1.2	<5	<0.5	<2	1	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	070711	SL-3-1	10:05 AM	28.8	8.93	8.70	120	80	50	2200	3	0.20	1.3	10	0.4	1.1	0.03	1.1	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	070711	SL-4-1	10:20 AM	28.6	8.98	8.54	120	30	22	300	2	0.03	1.1	10	<0.2	1.1	0.03	1.1	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	071111	SL-1-1	10:10 AM	30.1	7.35	7.83	170	90	90	280	3	0.18	1.5	10	0.4	0.8	0.02	0.79	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	071111	SL-2-1	10:25 AM	30.1	7.46	7.46	88	50	50	1800	3	0.2	1.2	16	0.5	0.84	0.02	0.86	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	071111	SL-3-1	10:37 AM	30.0	7.81	7.78	170	23	23	300	3	14	1.2	14	0.5	0.87	0.02	0.89	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	071111	SL-4-1	10:48 AM	30.1	7.88	7.50	88	130	50	1800	<1	0.23	1.2	15	0.3	0.79	0.02	0.81	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
CSO	>24 hrs	071411	SL-1-1	9:48 AM	28.7	8.75	8.62	130	930	430	4300																				
CSO	>24 hrs	071411	SL-2-1	9:55 AM	28.6	7.21	8.78	130	930	430	4300																				
CSO	>24 hrs	071411	SL-3-1	10:05 AM	28.9	6.89	8.20	120	930	430	4300	<8	0.28	1.5	20	0.4	0.79	<0.02	0.79	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
CSO	>24 hrs	071411	SL-4-1	10:15 AM	27.4	7.03	8.68	120	930	430	24000																				
CSO	>24 hrs	071411	SL-1-2	11:12 AM	29.3	MP	7.14		750	750	4300																				
CSO	>24 hrs	071411	SL-2-2	11:18 AM	29.0	MP	7.35		750	750	46000																				
CSO	>24 hrs	071411	SL-3-2	11:24 AM	28.2	8.43	7.44	110	430	430	2300	<5	0.32	1.3	25	0.3	0.81	<0.02	0.81	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
CSO	>24 hrs	071411	SL-4-2	11:33 AM	29.3	MP	7.38		2300	530	24000																				
CSO	>24 hrs	071411	SL-1-3	12:23 PM	28.9	6.71	8.67		930	930	46000																				
CSO	>24 hrs	071411	SL-2-3	12:30 PM	28.8	6.72	8.69		430	430	2300																				
CSO	>24 hrs	071411	SL-3-3	12:34 PM	29.1	6.08	7.08	110	430	230	2100	<5	0.15	1.3	25	0.4	0.8	<0.02	0.8	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
CSO	>24 hrs	071411	SL-4-3	12:40 PM	29.2	6.18	1.06		2300	230	4300																				
Routine	>24 hrs	071611	SL-1-1	9:35 AM	28.2	6.58	7.21	170	170	17	300	<1	0.17	1.2	16	<0.2	0.68	0.18	0.68	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	071811	SL-2-1	9:48 AM	28.1	6.58	7.18	92	25	22	220	<1	0.17	1	17	0.3	0.82	0.03	0.83	<5	<0.5	<2	1	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	071811	SL-3-1	10:00 AM	28.3	7.80	7.38	100	50	50	380	<1	0.14	0.9	21	<0.2	0.87	0.03	1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	071811	SL-4-1	10:11 AM	28.3	5.48	7.65	130	50	50	700	<1	0.1	0.8	17	<0.2	0.62	0.03	0.65	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072111	SL-1-1	8:33 AM	30.2	7.53	8.68	130	30	30	1100	3	0.11	0.7	18	0.3	0.07	0.02	0.09	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072111	SL-2-1	8:45 AM	30.5	7.35	8.45	130	200	100	1100	3	0.11	0.7	18	0.3	0.07	0.02	0.09	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072111	SL-3-1	8:56 AM	30.9	7.44	8.60	130	140	13	800	3	0.1	1.3	18	0.3	0.16	0.02	0.18	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072111	SL-4-1	9:05 AM	30.7	7.50	7.07	130	80	80	2400	3	0.09	1.3	21	<0.2	0.43	0.02	0.45	<5	<0.5	<2	1	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072511	SL-1-1	9:11 AM	32.0	7.21	8.55	140	21	17	140	2	0.12	1.7	15	<0.2	0.33	0.03	0.36	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072511	SL-2-1	9:24 AM	32.9	7.21	8.32	140	80	80	210	2	0.18	1.1	17	<0.2	0.8	0.02	0.82	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072511	SL-3-1	9:35 AM	31.9	6.09	8.34	140	80	80	130	3	0.14	1.0	30	<0.2	0.85	0.02	0.87	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072511	SL-4-1	9:45 AM	32.8	7.80	8.60	130	300	300	500	3	0.15	1	19	0.3	0.89	0.03	0.71	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072811	SL-1-1	9:10 AM	31.6	7.69	MP	130	80	27	500	3	0.12	1.4	18	0.3	0.69	0.03	0.77	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072911	SL-2-1	9:22 AM	31.4	7.65	7.64	140	17	7	220	<1	0.13	0.8	20	<0.3	1.1	<0.02	1.1	<5	<0.5	<2	3	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072811	SL-3-1	9:35 AM	31.4	7.1	MP	160	70	76	200	<1	0.11	1.1	23	0.3	0.65	<0.02	0.65	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	072811	SL-4-1	9:44 AM	31.4	7.93	8.91	120	170	170	300	2	0.12	0.8	19	<0.2	0.62	0.02	0.64	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	080111	SL-1-1	9:45 AM	31.8	6.66	7.22	120	70	70	300	8	0.12	1.6	14	<0.2	1.1	0.03	1.1	<5	<0.5	<2	2	<2	<0.5	<2	<5	<2	<10	<10	<5
Routine	>24 hrs	080111	SL-2-1	9:56 AM	31.8	7.25	7.89	140	40	40	400	<5	0.19	1.1	14	<0.2	1.1	0.02	1.1												

FIGURE 3



## APPENDIX B: HUNTING CREEK SAMPLING RESULTS

APPENDIX B: HUNTING CREEK SAMPLING RESULTS																																
Routine, Routine or CSO	Last CSO Event	Sample ID	SL	Field Data						Laboratory Data																						
				Date	Time	Temp (°C)	pH	DO - %	Hardness mg/L CaCO <sub>3</sub>	Fecal C.	E. Coli	Total Coliform	mg/L CBOD <sub>5</sub>	mg/L P or TP	TKN	mg/L TSS	mg/L N NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Arsenic	Cadmium	Cr III	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc	Cr VI	Oil/Grease	
Routine	>1	070912	SL5	11:30	28.5	7.08	6.26	160	900	500	1,600	5.7	0.038	1.6	9.5	<0.10	0	0	0.04	<5.0	1.4	3.8	5	<2.0	<0.20	4.4	<5.0	<1.0	25	<5	<5.0	
Routine	>1	070919	SL5	9:56	22.3	7.34	7.20	280	340	340	2,400	3.8	0.043	0.5	17	<0.10	0.88	0.014	<5.0	<5.0	<2.5	3.8	<2.0	<0.20	<5.0	<5.0	<1.0	24	<5	<5.0		
Routine	>1	070926	SL5	9:29	23.5	7.57	6.19	120	16,000	16,000	16,000	<3.0	0.040	0.30	16	<0.10	2.3	0.044	<5.0	<5.0	<2.5	2.5	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0		
Routine	>1	071003	SL6	10:00	24.1	7.48	6.84	140	1,700	1,700	5,500	<3.0	0.033	2.4	11	<0.10	4.9	0.036	<5.0	<5.0	<2.5	4.9	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0		
CSO	1	071025	SL5-1	14:45	17.2	7.10	5.05	65	3,000	3,000	18,000	<3.0	0.083	1.9	11	<0.10	1.3	0.029	<5.0	<5.0	<2.5	3.1	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0		
CSO	1	071025	SL5-2	18:45	16.5	4.72	5.5	75	18,000	18,000	18,000	<3.0	0.083	<0.12	20	<0.10	1.4	0.033	<5.0	<5.0	<2.5	3.2	<2.0	<0.20	<5.0	<5.0	<1.0	28	<5.0	<5.0		
CSO	1	071025	SL5-3	19:12	15.3	7.12	MP	75	9,000	2,800	>18,000	<3.0	0.083	<0.13	34	<0.10	1.1	0.047	<5.0	<5.0	<2.5	3.7	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0		
CSO	1	080112	SL5-1	7:48	10.9	MP	MP	87	13,000	13,000	13,000	<3.0	0.055	0.95	18	0.15	2.1	0.047	<5.0	<5.0	<2.5	3.2	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0		
CSO	1	080112	SL5-2	9:05	9.5	MP	MP	119	17,000	17,000	17,000	<3.0	0.041	1.3	26	0.2	2.4	0.03	<5.0	<5.0	<2.5	3.7	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0		
CSO	1	080112	SL5-3	10:49	9.3	MP	MP	120	7,900	7,900	7,900	<3.0	0.52	1.6	23	0.31	2.3	0.031	<5.0	<5.0	<2.5	2.8	3.1	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0	

N/A = Not Analyzed  
 MP = Measurement Problem  
 o = CSO ongoing

APPENDIX B : HUNTING CREEK SAMPLING RESULTS

Routine or CSO event	Last CSO Event (days)	Sample ID		Field Data				Hardness mg/L CaCO <sub>3</sub>	Laboratory Data																								
		Date (yyymmdd)	SL	Measurements Taken From Sampling Container in the Field					MPN/100 mL			mg/L		mg/L P or N		mg/L		mg/L N			µg/L												
									SM 9221E	SM 9223B	SM 9221B	EPA 388.1	EPA 351.2	SM 25400	SM 4500NH <sub>3</sub> - G	EPA 353.2	EPA 353.2	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 245.1	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	SM 3500 CR D	EPA 1694A			
Time	Temp (°C)	pH	DO - mg/L	Fecal C.	E. Coli	Total Coliform	CBCOD <sub>5</sub>	TP	TKN	TSS	NH <sub>3</sub> -N	NO <sub>2</sub> -N	NO <sub>3</sub> -N	Antimony	Cadmium	Cr III	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc	Cu VI	Oil/Grease								
Routine	>1	042308	SL5	11:40 AM	21.4	6.38	MP	80	1,600	1,600	1,600	3.3	<0.010	1.30	15.0	<0.10	1.60	0.027	<5.0	<5.0	<10.0	2.4	<5.0	<0.20	<4.0	<5.0	0.2	<10.0	<5.0	<5.0			
Routine	>1	043008	SL5	11:39 AM	20.1	6.62	MP	72	<20,000	<20,000	<20,000	<5.0	<0.010	0.82	<10.0	<0.10	0.79	0.018	<5.0	<5.0	<10.0	3.8	<5.0	<0.20	<4.0	<5.0	<0.20	19.0	<5.0	<5.0			
Routine	>1	050708	SL5	11:37 AM	30.8	6.70	MP	81	800	800	800	<3.0	0.028	0.76	<5.0	<0.10	1.30	0.020	<5.0	<5.0	<10.0	2.1	<5.0	<0.20	<4.0	<5.0	<0.20	11.0	<5.0	<5.0			
Routine	>1	051408	SL5	1:00 PM	31.1	6.68	MP	50	8,000	8,000	8,000	4.4	0.048	0.32	11.0	0.14	1.20	0.014	<5.0	<5.0	<10.0	2.8	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0			
Routine	>1	052708	SL5	12:15 PM	24.3	6.62	MP	74	2,200	1,700	2,200	<2.0	<0.010	0.81	6.5	0.84	1.20	0.013	<5.0	<5.0	<10.0	2.9	<5.0	<0.20	<4.0	<5.0	0.2	11.0	<5.0	<5.0			
CSO event	1	042908	SL5-1	12:00 PM	17.8	6.35	MP	83	<20,000	<20,000	20,000	3.9	<0.010	0.87	<10.0	0.10	0.04	0.024	<5.0	<5.0	<10.0	5.8	<5.0	<0.20	<4.0	<5.0	<0.20	20.0	<5.0	<5.0			
CSO event	1	042908	SL5-2	1:47 PM	18.7	6.42	MP	70	<20,000	<20,000	80,000	3.8	<0.010	0.88	14.0	0.17	0.11	0.027	<5.0	<5.0	<10.0	4.8	<5.0	<0.20	<4.0	<5.0	<0.20	20.0	<5.0	<5.0			
CSO event	1	042908	SL5-3	2:51 PM	19.8	6.49	MP	85	<20,000	<20,000	80,000	3.9	<0.010	0.91	10.0	0.17	0.04	0.025	<5.0	<5.0	<10.0	5.0	<5.0	<0.20	<4.0	<5.0	<0.20	20.0	<5.0	<5.0			
CSO event	1	052008	SL5-1	11:44 AM	15.2	6.71	MP	27	>1,600	>1,600	>1,600	<3.0	0.019	0.47	17.0	<0.10	0.57	0.022	<5.0	<5.0	<10.0	3.8	<5.0	0.21	<4.0	<5.0	<0.20	14.0	<5.0	<5.0			
CSO event	1	052008	SL5-2	1:11 PM	16.4	6.65	MP	30	>1,600	>1,600	>1,600	<3.0	0.017	0.51	16.0	<0.10	0.69	0.020	<5.0	<5.0	<10.0	3.7	<5.0	<0.20	<4.0	<5.0	<0.20	13.0	<5.0	<5.0			
CSO event	1	052008	SL5-3	2:45 PM	14.45	5.61	MP	40	>1,600	>1,600	>1,600	<3.0	0.017	0.57	15.0	<0.10	0.72	0.020	<5.0	<5.0	<10.0	3.8	<5.0	<0.20	<4.0	<5.0	<0.20	14.0	<5.0	<5.0			

Note:  
 Sampling analytical testing conducted by Microbac Laboratories, Inc.  
 SL = Sample Location Refer to Figure 3  
 MP = Measurement Problem, DO Probe Malfunction - DO probe either recalibrated in field and/or DO membrane replaced following sampling  
 1x CSO within 24 Hours  
 >1 = No CSO within last 24 Hours  
 CSO event samples collected within 24 hours of activation

APPENDIX C: HUNTING CREEK SAMPLING RESULTS

Routine or CSO event	Last CSO Event (days)	Sample ID		Field Data				Hardness	Laboratory Data																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Notes:  
 Sampling analytical testing conducted by Metrol Laboratories, Inc.  
 SL= Sample Location-Refer To Figure 3.  
 NA = Test value unavailable  
 1= CSO within 24 hours  
 >1 = No CSO within last 24 hours  
 CSO event samples collected within 24 hours of CSO activation  
 \* = Holding time has been exceeded, additional follow up samples were collected.  
 \* = Followup sample

APPENDIX B : HUNTING CREEK SAMPLING RESULTS

Routine or CSO event	Last CSO Event (days)	Sample ID		Field Data					Hardness		Laboratory Data		mg/L																mg/L		mg/L							
		Date	SL	Measurements Taken From Sampling Container in the Field					SM 2340 C mg/L CaCO <sub>3</sub>	SM 8221E mg/L CaCO <sub>3</sub>	MPN/100 ml		mg/L	mg/L P or N	mg/L	mg/L N		mg/L										mg/L	mg/L									
											SM 8223B	SM 9221B				SM 8210B	EPA 365.1	EPA 351.2	SM 2540D	SM 4500NH <sub>4</sub> -G	EPA 353.2	EPA 353.2	SM 4500NO <sub>3</sub> -H	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8			EPA 200.8	EPA 245.1	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	SM 3500 CR D	EPA 1564A
Routine	>1	041210	SL-5-1	12:05 PM	18.3	8.17	10.81	120	43	23	1,100	<5	0.05	1.1	8	0.4	1.0	<0.02	1.0	<5	<0.5	4	8	<2	<0.5	170	<5	<0.2	30	<10	<5							
Routine	>1	041810	SL-5-1	8:10 AM	14.5	6.90	8.33	120	460*	460*	460*	<1	0.08	1.3	8	0.6	<0.2	0.03	2.9	<5	<0.5	<2	3	<2	<0.5	5	<5	<0.2	40	<10	<5							
Routine	>1	042610	SL-5-1	9:00 AM	18.4	7.11	7.82	146	240	240	1100	<1	0.11	0.9	9	0.3	1.7	<0.02	1.7	<5	<0.5	<2	2	<2	<0.5	3	<5	<0.2	30	<10	<5							
Routine	>1	051010	SL-5-1	9:45 AM	18.0	6.29	10.07	190	75	75	430	<1	0.08	1.7	5	0.6	1.0	<0.02	1.8	<5	<0.5	<2	4	<2	<0.5	3	<5	<0.2	40	<10	<5							
CSO	<1	051210	SL-5-1	8:30 AM	16.6	6.47	10.65	240	210*	210*	2400*	3	0.07	1.3	11	<0.2	1.2	<0.2	1.2	<5	<0.5	<2	3	<2	<0.5	<2	<0.5	<2	<0.2	<10	<10	<5						
CSO	<1	061210	SL-5-2	10:05 AM	18.1	6.27	12.40	260	930*	930*	4600*	8	0.04	2.1	6	0.9	2.8	0.02	2.5	<5	<0.5	<2	3	<2	<0.5	3	<5	<0.2	<10	<10	<5							
CSO	<1	061210	SL-5-3	11:10 AM	19.3	6.27	10.43	330	1500	1500	4600	<1	0.07	2.4	<1	0.8	3	0.02	3.0	<5	<0.5	<2	3	<2	<0.5	3	<5	<0.2	<10	<10	<5							
CSO	<1	073010	SL-5-1	9:10 AM	23.2	6.14	5.99	55	1500	>=24000	>=24000	2	0.09	0.6	12	<0.2	0.9	<0.02	0.8	<5	<0.5	<2	2	2	<0.5	<2	<5	<0.2	30	<10	7							
CSO	<1	073010	SL-5-2	10:50 AM	26.8	5.36	5.55	80	2100	2100	2100	<1	0.12	1.2	23	<0.2	0.8	<0.02	0.8	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	20	<10	<5							
CSO	<1	080610	SL-5-1	11:25 AM	-	-	-	-	11000*	11000*	>=24000*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
CSO	<1	080610	SL-5-2	12:09 PM	-	-	-	-	11000*	11000*	>=24000*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
CSO	<1	080610	SL-5-3	12:42 PM	-	-	-	-	430	430	1200	-	0.06	1.2	6	0.3	1.1	<0.02	1.1	<5	<0.5	<2	3	<2	<0.5	3	<5	<0.2	10	<10	<5							
Routine	>1	081010	SL-5-1	12:16 PM	-	-	-	-	430*	430*	930*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						

Notes:  
 Sampling analytical testing conducted by Mettler Laboratories, Inc.  
 SL= Sample Location - Refer To Figure 2.  
 In CSO within 24 Hours  
 >1 = No CSO within last 24 Hours  
 CSO event samples collected within 24 hours of CSO activation  
 \* = Holding time has been exceeded, additional follow up samples were collected.  
 \* = Follow-up sample

APPENDIX A: HUNTING CREEK SAMPLING RESULTS

Routine or CSD event	Last CSD Event	Sample ID		Field Data				Hardness SM 2340 C mg/L CaCO3	Laboratory Data																							
		Date (mm/dd/yy)	SL	Measurements Taken From Sampling Container in the Field					MPN/100 mL			mg/L		mg/L P or N		mg/L		mg/L N		mg/L												
									SM 6221E	SM 9223B	SM 9221B	SM 5210B	EPA 365.1	EPA 361.2	SM 2540D	SM 4500NH3-G	EPA 353.2	EPA 353.2	SM 4500NH3-H	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 245.1	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	EPA 200.8	SM 3600 CR D	mg/L EPA 1864A	
Time	Temp (°C)	pH	DO - mg/L	Fecal C.	E. Coli	Total Coliform	CBOD5	TP	TKN	TSS	NH3-N	NO3-N	NO3-N	NO3-N	Antimony	Cadmium	Chlorine	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc	Cr VI	Oil/Grease						
Routine	>24 hrs	071111	SL-5-1	12:00 PM	29.5	6.48	6.25	110	110	110	1,600	<5	0.41	1.8	9	0.4	2.1	0.23	2.1	<5	<0.5	<2	3	<2	<0.5	2	<5	<0.2	30	<10	<5	
CSD	<24 hrs	071411	SL-5-1	10:45 AM	25.7	6.60	6.1	150	2260	2300	15000	<5	0.40	1.8	11	0.3	1.5	0.02	1.8	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	30	<10	<5	
CSD	<24 hrs	071411	SL-5-2	11:57 AM	26.0	6.62	6.15	150	930	930	3500	<5	0.26	1.5	8	0.2	0.9	0.02	0.92	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	30	<10	<5	
CSD	<24 hrs	071411	SL-5-3	1:19 PM	27.5	6.24	6.55	62	930	930	6300	<5	0.03	1.2	8	0.2	0.96	0.03	0.99	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	30	<10	6.5	
Routine	>24 hrs	071811	SL-5-1	11:16 AM	29.4	6.51	6.33	7	300	60	500	2	0.13	1.3	24	<0.2	0.48	0.03	0.51	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5	
Routine	>24 hrs	072511	SL-5-1	10:37 AM	30.5	6.90	7.09	120	290	290	5000	2	0.15	1.6	9	<0.2	2.5	0.02	2.5	<5	<0.5	<2	3	<2	<0.5	2	<5	<0.2	10	<10	<5	
Routine	>24 hrs	080111	SL-5-1	10:20 AM	31.0	7.02	7.48	130	300	300	1100	2	0.11	1.3	23	<0.2	0.62	0.05	0.64	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	7	
CSD	<24 hrs	081511	SL-5-1	10:01 AM	25.3	6.76	7.58	96	3200	1400	30000	2	0.18	0.8	26	<0.2	0.24	<0.02	0.24	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	10	<10	<5	
CSD	<24 hrs	081511	SL-5-2	11:36 AM	25.9	6.75	6.96	88	3000	1700	30000	2	0.23	0.8	18	0.3	0.67	<0.02	0.67	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	20	<10	<5	
CSD	<24 hrs	081511	SL-5-3	12:30 PM	25.5	6.71	6.54	82	13000	13000	24000	<1	0.17	0.8	17	<0.2	0.72	<0.02	0.72	<5	<0.5	<2	4	<2	<0.5	<2	<5	24	20	<10	<5	

Note:  
 Sampling analytical testing conducted by Metrol Laboratories, Inc.  
 SL = Sample Location (Refer To Figure 3)  
 <24 hrs = CSD within 24 Hours  
 >24 hrs = No CSD within last 24 Hours  
 CSD event samples collected within 24 hours of CSD activation



To: Douglas Frasier  
From: Katie Conaway

Date: August 24, 2011  
Subject: Planning Statement for Alexandria Combined Sewer System  
Permit Number: VA0087068

**Discharge Type:** Combined Sewer System

**Outfall 001:**

Receiving Stream: Oronoco Bay (Potomac River)  
Discharge Flow (Average Flow per CSO Event): 1.36 MG  
Latitude/Longitude: 38° 48' 36" / -77° 02' 20"  
Streamcode: 1aPOT  
Waterbody: VAN-A12E  
Water Quality Standards: Class II, Section 6. Special Standards: b, y.  
Rivermile: 108.72  
Drainage Area: 224 acres

**Outfall 002:**

Receiving Stream: Hunting Creek  
Discharge Flow (Average Flow per CSO Event): 1.41 MG  
Latitude/Longitude: 38° 47' 30" / -77° 02' 49"  
Streamcode: 1aHUT  
Waterbody: VAN-A13E  
Water Quality Standards: Class II, Section 6. Special Standards: b, y.  
Rivermile: 0.60  
Drainage Area: 184 acres

**Outfall 003:**

Receiving Stream: Hooff Run  
Discharge Flow (Average Flow per CSO Event): 0.66 MG  
Latitude/Longitude: 38° 48' 14.9" / -77° 03' 28.8"  
Streamcode: 1aHFF  
Waterbody: VAN-A13R  
Water Quality Standards: Class III, Section 7. Special Standards: b.  
Rivermile: 0.70  
Drainage Area: 132 acres

**Outfall 004:**

Receiving Stream: Hooff Run  
Discharge Flow (Average Flow per CSO Event): 0.27 MG  
Latitude/Longitude: 38° 48' 11.7" / -77° 03' 29.6"  
Streamcode: 1aHFF  
Waterbody: VAN-A13R  
Water Quality Standards: Class III, Section 7. Special Standards: b.  
Rivermile: 0.63  
Drainage Area: N/A, same as Outfall 003

1. Is there monitoring data for the receiving stream? If yes, please attach latest summary. If no, where is the nearest downstream monitoring station?

**Outfall 001:** There is no DEQ monitoring data available for this receiving stream. This waterbody flows into the Potomac River, which, at this specific location, is under the jurisdiction of the District of Columbia.

**Outfall 002:** Yes. The closest DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 0.28 rivermiles from Outfall 002. The following is a monitoring summary for this station, as taken from the 2010 Integrated Assessment:

*Class II, Section 6, Special Standard: b, y.*

*DEQ ambient water quality and fish tissue monitoring stations 1aHUT000.01, at the George Washington Parkway, 1aHUT001.54, 300 yards downstream from Telegraph Road, and 1aHUT001.72, at Route 611/241 (Telegraph Road).*

*The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and PCB fish tissue monitoring. Additionally, SPMD data (at station 1aHUT001.54) and water quality data (at station 1aHUT001.72) each revealed exceedances of the human health criteria of 0.64 parts per billion (ppb) PCBs. A PCB TMDL for the tidal Potomac River watershed has been completed and approved. E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The wildlife use is considered fully supporting.*

*The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. The wildlife use is considered fully supporting.*

**Outfall 003:** There are no DEQ monitoring stations located on Hoaff Run. The closest downstream DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 1.29 rivermiles downstream from Outfall 003. The following is a monitoring summary for this station, as taken from the 2010 Integrated Assessment:

*Class II, Section 6, Special Standard: b, y.*

*DEQ ambient water quality and fish tissue monitoring stations 1aHUT000.01, at the George Washington Parkway, 1aHUT001.54, 300 yards downstream from Telegraph Road, and 1aHUT001.72, at Route 611/241 (Telegraph Road).*

*The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and PCB fish tissue monitoring. Additionally, SPMD data (at station 1aHUT001.54) and water quality data (at station 1aHUT001.72) each revealed exceedances of the human health criteria of 0.64 parts per billion (ppb) PCBs. A PCB TMDL for the tidal Potomac River watershed has been completed and approved. E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The wildlife use is considered fully supporting.*

*The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. The wildlife use is considered fully supporting.*

**Outfall 004:** There are no DEQ monitoring stations located on Hooff Run. The closest downstream DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 1.22 rivermiles downstream from Outfall 004. The following is a monitoring summary for this station, as taken from the 2010 Integrated Assessment:

*Class II, Section 6, Special Standard: b, y.*

*DEQ ambient water quality and fish tissue monitoring stations 1aHUT000.01, at the George Washington Parkway, 1aHUT001.54, 300 yards downstream from Telegraph Road, and 1aHUT001.72, at Route 611/241 (Telegraph Road).*

*The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and PCB fish tissue monitoring. Additionally, SPMD data (at station 1aHUT001.54) and water quality data (at station 1aHUT001.72) each revealed exceedances of the human health criteria of 0.64 parts per billion (ppb) PCBs. A PCB TMDL for the tidal Potomac River watershed has been completed and approved. E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The wildlife use is considered fully supporting.*

*The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. The wildlife use is considered fully supporting.*

2. Is the receiving stream on the current 303(d) list?
  - a. If yes, what is the impairment?
  - b. Has the TMDL been prepared?
  - c. If yes, what is the WLA for the discharge?
  - d. If no, what is the schedule for the TMDL?

**Outfall 001:** No. The Virginia portion of the Potomac River (Oronoco Bay) that receives the discharge from Outfall 001 is not currently listed on the 303(d) list.

- a. N/A
- b. N/A
- c. N/A
- d. N/A

**Outfall 002:** Yes. Hunting Creek is on the impaired waters list.

- a. Recreational Use Impairment: Sufficient excursions from the maximum E. coli bacteria criterion (17 of 39 samples - 43.6%) were recorded at DEQ's ambient water quality monitoring station (1aHUT000.01) at the George Washington Parkway crossing and (3 of 11 - 27.3%) were recorded at DEQ's ambient water quality monitoring station (1aHUT001.72) at Route 611/241 (Telegraph Road) to assess this stream segment as not supporting the recreation use goal for the 2010 water quality assessment.

Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch, gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek. Additionally, there were excursions above the water quality criterion based fish tissue value (TV) of 20 parts per billion (ppb) for polychlorinated biphenyls (PCBs) in fish tissue were recorded in 6 species) of fish (12 total samples); largemouth bass, carp, white sucker, gizzard shad, white perch and redbreast sunfish collected at monitoring station 1aHUT000.01 in 2008.

- b. TMDL for Recreational Use Impairment: Yes. EPA Approved 11/10/2010  
TMDL for PCBs in Fish Tissue: Yes. EPA Approved 10/31/2007
- c. WLA for Recreational Use Impairment:  $6.26E+13$  cfu/year of *E. coli* bacteria. This is an 80% required reduction.

WLA for PCBs in Fish Tissue Impairment: VA0087068 was identified as a source of PCBs in the TMDL, and was provided a Waste Load Allocation.

- d. N/A

**Outfall 003:** No. The receiving stream (non-tidal portion of Hooff Run) has not been assessed by DEQ and therefore, is not on the impaired waters list.

- a. N/A
- b. N/A
- c. N/A
- d. N/A

**Outfall 004:** No. The receiving stream (non-tidal portion of Hooff Run) has not been assessed by DEQ and therefore, is not on the impaired waters list.

- a. N/A
- b. N/A
- c. N/A
- d. N/A

**3. If the answer to (2) above is no, is there a downstream 303(d) listed impairment?**

- a. If yes, what is the impairment?
- b. Has a TMDL been prepared?
- c. Will the TMDL include the receiving stream?
- d. Is there a WLA for the discharge?
- e. What is the schedule for the TMDL?

**Outfall 001:** Yes. The District of Columbia's portion of the Potomac River that stretches from Haines Point to the Woodrow Wilson Bridge (referred to as the "Lower Potomac" segment in DC's Integrated Assessment) is listed as impaired on the 2010 3030(d) list.

- a. Bacteria Impairment, Fecal Coliform Bacteria  
Organics Impairment, PCBs
- b. Bacteria Impairment – Yes. Completed in 2004  
PCB Impairment – Yes. Completed in 2007
- c. Bacteria TMDL – Yes.  
PCB TMDL – Yes.
- d. Bacteria TMDL – No WLA specifically given to the Alexandria CSS.  
PCB TMDL – Yes. VA0087068 was identified as a source of PCBs in the TMDL, and was provided a Waste Load Allocation.
- e. See "b" above.

**Outfall 002:** N/A

**Outfall 003:** Yes. There are several downstream listed stream segments, including tidal Hooff Run and tidal Hunting Creek.

- a. Tidal Hooff Run Impairment: Fish Consumption Use Impairment: Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch, gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek.

Hunting Creek Recreational Use Impairment: Sufficient excursions from the maximum E. coli bacteria criterion (17 of 39 samples - 43.6%) were recorded at DEQ's ambient water quality monitoring station (1aHUT000.01) at the George Washington Parkway crossing and (3 of 11 - 27.3%) were recorded at DEQ's ambient water quality monitoring station (1aHUT001.72) at Route 611/241 (Telegraph Road) to assess this stream segment as not supporting the recreation use goal for the 2010 water quality assessment.

Hunting Creek Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch,

gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek. Additionally, there were excursions above the water quality criterion based fish tissue value (TV) of 20 parts per billion (ppb) for polychlorinated biphenyls (PCBs) in fish tissue were recorded in 6 species) of fish (12 total samples); largemouth bass, carp, white sucker, gizzard shad, white perch and redbreast sunfish collected at monitoring station 1aHUT000.01 in 2008.

- b. TMDL for Recreational Use Impairment: Yes. EPA Approved 11/10/2010  
TMDL for PCBs in Fish Tissue: Yes. EPA Approved 10/31/2007
- c. While the TMDLs did not specifically include the receiving stream (non-tidal Hooff Run) the TMDLs did include all upstream point sources in the watershed.
- d. WLA for Recreational Use Impairment:  $7.68E+11$  cfu/year of *E. coli* bacteria. This is a 99% required reduction.

WLA for PCBs in Fish Tissue Impairment: VA0087068 was identified as a source of PCBs in the TMDL, and was provided a Waste Load Allocation.

- e. See "b" above.

Outfall 004: Yes. There are several downstream listed stream segments, including tidal Hooff Run and tidal Hunting Creek.

- a. Tidal Hooff Run Impairment: Fish Consumption Use Impairment: Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch, gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek.

Hunting Creek Recreational Use Impairment: Sufficient excursions from the maximum *E. coli* bacteria criterion (17 of 39 samples - 43.6%) were recorded at DEQ's ambient water quality monitoring station (1aHUT000.01) at the George Washington Parkway crossing and (3 of 11 - 27.3%) were recorded at DEQ's ambient water quality monitoring station (1aHUT001.72) at Route 611/241 (Telegraph Road) to assess this stream segment as not supporting the recreation use goal for the 2010 water quality assessment.

Hunting Creek Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish

consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch, gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek. Additionally, there were excursions above the water quality criterion based fish tissue value (TV) of 20 parts per billion (ppb) for polychlorinated biphenyls (PCBs) in fish tissue were recorded in 6 species) of fish (12 total samples); largemouth bass, carp, white sucker, gizzard shad, white perch and redbreast sunfish collected at monitoring station 1aHUT000.01 in 2008.

- b. TMDL for Recreational Use Impairment: Yes. EPA Approved 11/10/2010  
TMDL for PCBs in Fish Tissue: Yes. EPA Approved 10/31/2007
- c. While the TMDLs did not specifically include the receiving stream (non-tidal Hooff Run) the TMDLs did include all upstream point sources in the watershed.
- d. WLA for Recreational Use Impairment: **8.52E+11 cfu/year of *E. coli* bacteria. This is a 99% required reduction.**

WLA for PCBs in Fish Tissue Impairment: VA0087068 was identified as a source of PCBs in the TMDL, and was provided a Waste Load Allocation.

- e. See "b" above.

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

- Rather than including a numeric WLA for PCBs, please include the special conditions text regarding PCB monitoring.
- There is a completed downstream TMDL for the aquatic life use impairment for the Chesapeake Bay. However, the Bay TMDL and the WLAs contained within the TMDL are not addressed in this planning statement.

5. Fact Sheet Requirements – Please provide information on other VPDES permits or VADEQ monitoring stations located within a 2 mile radius of the facility. In addition, please provide information on any drinking water intakes located within a 5 mile radius of the facility.

There are several DEQ monitoring stations within a 2 mile radius of this facility:

- 1aHUT000.01: Hunting Creek at the George Washington Memorial Highway bridge crossing
- 1aHUT001.54: Hunting Creek, located 300 yards downstream from the Telegraph Road bridge crossing
- 1aHUT001.72: Hunting Creek at the Telegraph Road bridge crossing

There are several VPDES permitted facilities within a 2 mile radius of this facility:

- VA0090107 – Carlyle Development II
- VA0025160 – Alexandria Advanced Wastewater Treatment Plant

There are no drinking water intakes within a five mile radius of this facility.

Dissolved Oxygen Criteria (9VAC25-260-185)

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water <sup>1,2</sup>	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity)	Year-round
	30-day mean > 5 mg/L (tidal habitats with >0.5 ppt salinity)	
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29°C	
	Instantaneous minimum > 4.3 mg/L at temperatures > 29°C	
Deep-water	30-day mean > 3 mg/L	June 1-September 30
	1-day mean > 2.3 mg/L	
	Instantaneous minimum > 1.7 mg/L	
Deep-channel	Instantaneous minimum > 1 mg/L	June 1-September 30

<sup>1</sup>See subsection aa of 9VAC25-260-310 for site specific seasonal open-water dissolved oxygen criteria applicable to the tidal Mattaponi and Pamunkey Rivers and their tidal tributaries.

<sup>2</sup>In applying this open-water instantaneous criterion to the Chesapeake Bay and its tidal tributaries where the existing water quality for dissolved oxygen exceeds an instantaneous minimum of 3.2 mg/L, that higher water quality for dissolved oxygen shall be provided antidegradation protection in accordance with section 30 subsection A.2 of the Water Quality Standards.



# Outall 001

Date	Temperature	pH	CaCO3	cBOD5	TP	NH3	TSS	Copper	Zinc	Cr VI	O&G
10/26/2007	14.9	6.96	30	0	0.53	0.29	47	12	54	8.3	0
10/26/2007	17.2	6.87	30	0	0.45	0.23	40	13	55	0	0
10/26/2007	17.6	7.42	40	0	0.58	0	34	11	39	0	0
10/26/2007	18.1	7.4	3.2	0	0.73	0.55	39	15	45	6.2	0
11/15/2007	15.9	7.11	50	11	1	1.5	170	18	30	*	12
11/15/2007	14	7.1	34	12	0.41	0.9	41	16	69	*	0
11/15/2007	14.9	7.05	47	9.6	0.59	1.3	17	14	60	*	0
11/15/2007	13.7	7.25	40	8.5	0.68	1.3	39	16	61	*	0
1/11/2008	10.9	MP	50	13	0.61	1.3	85	10	26	6.3	8
1/11/2008	11.4	MP	40	12	0	1.4	67	14	29	5.7	6
2/1/2008	6.3	6.2	74	48	0.67	1.5	87	11	72	0	5.4
2/1/2008	5	6.86	36	38	0.75	1.2	200	7.4	50	0	5.5
2/1/2008	5.8	6.65	28	24	0.51	1.1	51	12	64	0	13
2/1/2008	6.1	6.81	30	19	0.39	0.88	49	12	61	0	9
2/1/2008	6.8	6.68	48	31	0.57	0.92	42	15	72	6	20

90th percentile: 14.9

90th percentile: 7.4

Average: 39

Temperature

°C

pH

S.U.

CaCO3, cBOD5, TP NH3 and TSS

mg/L

Copper, Zinc, CR VI, O&G

µg/L

MP = Measurement Problem, probe malfunction

\*Not Analyzed

# Outall 002

Date	Temperature	pH	CaCO3	cBOD5	TP	NH3	TSS	Copper	Zinc	Cr VI	O&G
4/28/2008	17.8	5.54	23	31	0.3	1.8	22	28	42	5.3	0
4/28/2008	18.1	5.57	22	22	0.26	0.79	16	30	41	5.3	0
4/28/2008	18.2	5.82	20	29	0.39	0.78	17	30	43	6.7	0
4/28/2008	17.2	6.43	4	19	0.2	0.36	0	14	21	0	0
5/9/2008	19	6.31	72	14	0.42	1.3	22	15	42	0	0
5/9/2008	19	6.81	0	7.5	0.21	0.53	23	12	29	0	0
5/9/2008	18.8	6.72	0	4.5	0.21	0.37	28	11	24	0	0
5/9/2008	18.8	6.66	28	7.8	0.28	0.51	20	11	31	0	0
5/9/2008	19	6.74	0	5.4	0.16	0.29	36	9.8	23	0	0
5/12/2008	22.6	5.7	80	6.6	0.41	0.75	26	17	40	0	0
5/12/2008	17.2	5.58	92	5.4	0.4	0.73	21	17	35	0	0
5/12/2008	20.7	5.45	50	6.3	0.32	0.59	19	16	31	0	0
5/12/2008	18.4	5.13	82	6	0.44	0.23	23	15	35	0	0
5/12/2008	24.9	MP	70	6	0.34	0.67	21	17	49	0	0
5/12/2008	26	MP	98	5.4	0.44	0.77	18	3.5	0	0	0
7/22/2008	26.3	6.68	48	23	1.2	4.7	130	73	51	10	8.2

90th percentile: 25.5

90th percentile: 6.7

Average: 43

Temperature °C  
pH S.U.  
CaCO3, cBOD5, TP NH3 and TSS mg/L  
Copper, Zinc, CR VI, O&G µg/L

MP = Measurement Problem, probe malfunction

### Outfall 003

Date	Temperature	pH	CaCO3	cBOD5	TP	NH3	TSS	Copper	Zinc	Cr VI	O&G
5/4/2009	16	6.64	44	21	1.2	1.5	52	8	50	0	6
5/4/2009	16.6	7.89	72	39	1.2	2	38	9	20	0	7
5/26/2009	20.9	6.9	470	24	1.1	1.9	71	6	30	0	0
5/26/2009	20.6	6.67	100	31	1.3	2	37	10	30	0	13
6/3/2009	24.9	6.13	140	68	0.46	1.1	100	15	90	0	8
6/3/2009	24.1	6.01	130	17	0.45	0.6	51	12	60	0	7
6/3/2009	24.2	5.87	130	15	0.47	1.1	71	8	50	0	7
6/3/2009	22.1	6.54	110	92	1.2	2.5	47	9	50	0	15
7/23/2009	27.2	6.46	140	42	1.3	3.4	78	19	70	0	7
7/23/2009	26.7	6.27	150	49	1.3	4	72	22	80	0	15

90th percentile: 26.8

90th percentile: 7.0

Average: 149

Temperature

°C

pH

S.U.

CaCO3, cBOD5, TP NH3 and TSS

mg/L

Copper, Zinc, CR VI, O&G

µg/L

# Outall 004

Date	Temperature	pH	CaCO3	cBOD5	TP	NH3	TSS	Copper	Zinc	Cr VI	O&G
5/3/2010	21.5	7.35	270	99	3.5	18	90	6	10	0	13
5/3/2010	21.4	7.34	350	91	3.7	18	88	6	10	0	15
5/3/2010	21.2	7.53	480	91	4.1	19	140	5	0	0	14
6/1/2010	24.2	5.75	80	10	0.8	0.8	53	7	200	0	0
6/1/2010	24.5	6.75	95	32	0.7	2.9	78	8	50	0	0
7/10/2010	26.1	7	50	59	1.8	8.2	34	13	50	0	12
7/10/2010	26	6.75	44	56	1.6	7.8	55	12	50	0	9
7/10/2010	25.9	6.29	52	59	1.3	4.7	82	6	40	0	11
7/10/2010	26.1	6.91	78	71	1.6	5.7	73	9	50	0	13
7/29/2010	29.5	6.7	210	78	1.9	6.7	250	7	40	0	16
7/29/2010	29.5	7.06	80	53	1.4	7.3	95	18	70	0	12
7/29/2010	27.7	6.38	90	56	1.4	3.7	150	5	40	0	11
7/29/2010	27	6.5	100	71	1.8	6.9	71	0	20	0	32

90th percentile: 29.1

90th percentile: 7.3

Average: 152

Temperature

°C

pH

S.U.

CaCO3, cBOD5, TP NH3 and TSS

mg/L

Copper, Zinc, CR VI, O&G

µg/L

MP = Measurement Problem, probe malfunction

# FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: City of Alexandria CSS - Outfall 001

Permit No.: VA0087068

Receiving Stream: Orinoco Bay

Version: OWP Guidance Memo 00-2011 (8/24/00)

## Stream Information

Mean Hardness (as CaCO3) = 134 mg/L  
 90% Temperature (Annual) = 30 deg C  
 90% Temperature (Wet season) = 19 deg C  
 90% Maximum pH = 7.8 SU  
 10% Maximum pH = 6.3 SU  
 Tier Designation (1 or 2) = 1  
 Public Water Supply (PWS) Y/N? = n  
 Trout Present Y/N? = n  
 Early Life Stages Present Y/N? = y

## Stream Flows

1Q10 (Annual) = 1 MGD  
 7Q10 (Annual) = 1 MGD  
 30Q10 (Annual) = 1 MGD  
 1Q10 (Wet season) = 1 MGD  
 30Q10 (Wet season) = 1 MGD  
 30Q5 = 1 MGD  
 Harmonic Mean = 1 MGD

## Mixing Information

Annual - 1Q10 Mix = 100 %  
 - 7Q10 Mix = 100 %  
 - 30Q10 Mix = 100 %  
 Wet Season - 1Q10 Mix = 100 %  
 - 30Q10 Mix = 100 %

## Effluent Information

Mean Hardness (as CaCO3) = 39 mg/L  
 90% Temp (Annual) = 25 deg C  
 90% Temp (Wet season) = 15 deg C  
 90% Maximum pH = 7.4 SU  
 10% Maximum pH = 6.7 SU  
 Discharge Flow = 1 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile <sup>c</sup>	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin <sup>c</sup>	0	3.0E+00	--	na	5.0E-04	6.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	1.83E+01	1.80E+00	na	--	3.7E+01	3.6E+00	na	--	--	--	--	--	--	--	--	--	3.7E+01	3.6E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	1.83E+01	3.54E+00	na	--	3.7E+01	7.1E+00	na	--	--	--	--	--	--	--	--	--	3.7E+01	7.1E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	8.8E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	8.8E+02	3.0E+02	na	--
BaP <sup>um</sup>	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene <sup>c</sup>	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benzidine <sup>c</sup>	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis(2-Chloroethyl) Ether <sup>c</sup>	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis(2-Chloroisopropyl) Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoform <sup>c</sup>	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	3.3E+00	1.0E+00	na	--	6.7E+00	2.0E+00	na	--	--	--	--	--	--	--	--	--	6.7E+00	2.0E+00	na	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	na	1.8E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	8.6E-03	na	1.6E-02
Chlordane	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>c</sup>	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	1.7E-01	8.2E-02	na	--
Chromium III	0	5.1E+02	6.6E+01	na	--	1.0E+03	1.3E+02	na	--	--	--	--	--	--	--	--	--	1.0E+03	1.3E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.2E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene <sup>c</sup>	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	3.6E-02
Copper	0	1.2E+01	7.9E+00	na	--	2.3E+01	1.6E+01	na	--	--	--	--	--	--	--	--	--	2.3E+01	1.6E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	4.4E+01	1.0E+01	na	3.2E+04
DDD <sup>c</sup>	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDE <sup>c</sup>	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	4.4E-03
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	2.2E+00	2.0E-03	na	4.4E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	3.4E-01	3.4E-01	na	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
3,3-Dichlorobenzidine <sup>c</sup>	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	5.6E-01
Dichlorobromomethane <sup>c</sup>	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
1,2-Dichloroethane <sup>c</sup>	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	5.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane <sup>c</sup>	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
1,3-Dichloropropane <sup>c</sup>	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	4.8E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
2,4-Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	5.6E+02
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	1.0E-07
1,2-Diphenylhydrazine <sup>c</sup>	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Endrin	0	8.9E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	1.7E-01	7.2E-02	na	1.2E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	6.0E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
Fluorane	0	--	--	na	6.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor <sup>C</sup>	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.8E-03	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	1.6E-03
Heptachlor Epoxide <sup>C</sup>	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	7.8E-04
Hexachlorobenzene <sup>C</sup>	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	5.8E-03
Hexachlorobutadiene <sup>C</sup>	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Hexachlorocyclohexane	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	9.8E-02
Alpha-BHC <sup>C</sup>	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Hexachlorocyclohexane	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Gamma-BHC <sup>C</sup> (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	1.9E+00	--	na	3.6E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Hexachloroethane <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	4.0E+00	na	--
Indeno (1,2,3-cd) pyrene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone <sup>C</sup>	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
Kapone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	9.9E+01	1.1E+01	na	--	2.0E+02	2.2E+01	na	--	--	--	--	--	--	--	--	--	2.0E+02	2.2E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	2.8E+00	1.5E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Methylene Chloride <sup>C</sup>	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	6.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	1.8E+02	1.8E+01	na	4.6E+03	3.2E+02	3.6E+01	na	9.2E+03	--	--	--	--	--	--	--	--	3.2E+02	3.6E+01	na	9.2E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine <sup>C</sup>	0	--	--	na	3.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	--	--	na	8.0E+01
N-Nitrosodiphenylamine <sup>C</sup>	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
N-Nitrosodi-n-propylamine <sup>C</sup>	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	5.6E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	1.3E-01	2.6E-02	na	--
PCB Total <sup>C</sup>	0	--	1.4E-02	na	8.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.8E-02	na	1.3E-03
Pentachlorophenol <sup>C</sup>	0	5.0E+00	3.9E+00	na	3.0E+01	1.0E+01	7.7E+00	na	6.0E+01	--	--	--	--	--	--	--	--	1.0E+01	7.7E+00	na	6.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	1.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	4.0E+01	1.0E+01	na	8.4E+03
Silver	0	2.7E+00	--	na	--	5.4E+00	--	na	--	--	--	--	--	--	--	--	--	5.4E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane <sup>C</sup>	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	--	--	na	8.0E+01
Tetrachloroethylene <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	--	--	na	9.4E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene <sup>C</sup>	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.6E-03	--	--	--	--	--	--	--	--	1.6E+00	4.0E-04	na	5.6E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	9.2E-01	1.4E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
1,1,2-Trichloroethane <sup>C</sup>	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
Trichloroethylene <sup>C</sup>	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	--	--	na	6.0E+02
2,4,6-Trichlorophenol <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
Zinc	0	1.0E+02	1.0E+02	na	2.6E+04	2.1E+02	2.1E+02	na	5.2E+04	--	--	--	--	--	--	--	--	2.1E+02	2.1E+02	na	6.2E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline =  $(0.25(WQC - \text{background conc.}) + \text{background conc.})$  for acute and chronic  
=  $(0.1(WQC - \text{background conc.}) + \text{background conc.})$  for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	1.2E+00
Chromium III	7.9E+01
Chromium VI	1.3E+01
Copper	9.4E+00
Iron	na
Lead	1.3E+01
Manganese	na
Mercury	9.2E-01
Nickel	2.2E+01
Selenium	6.0E+00
Silver	2.2E+00
Zinc	8.3E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance



# FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: City of Alexandria CSS Outfall 002

Permit No.: VA0087068

Receiving Stream: Hunting Creek

Version: OWP Guidance Memo 00-2011 (8/24/00)

## Stream Information

Mean Hardness (as CaCQ3) = 106 mg/L  
 90% Temperature (Annual) = 29 deg C  
 90% Temperature (Wet season) = 20 deg C  
 90% Maximum pH = 7.1 SU  
 10% Maximum pH = 5.6 SU  
 Tier Designation (1 or 2) = 1  
 Public Water Supply (PWS) Y/N? = n  
 Trout Present Y/N? = n  
 Early Life Stages Present Y/N? = y

## Stream Flows

1Q10 (Annual) = 1 MGD  
 7Q10 (Annual) = 1 MGD  
 30Q10 (Annual) = 1 MGD  
 1Q10 (Wet season) = 1 MGD  
 30Q10 (Wet season) = 1 MGD  
 30Q5 = 1 MGD  
 Harmonic Mean = 1 MGD

## Mixing Information

Annual - 1Q10 Mix = 100 %  
 - 7Q10 Mix = 100 %  
 - 30Q10 Mix = 100 %  
 Wet Season - 1Q10 Mix = 100 %  
 - 30Q10 Mix = 100 %

## Effluent Information

Mean Hardness (as CaCQ3) = 43 mg/L  
 90% Temp (Annual) = 25.5 deg C  
 90% Temp (Wet season) = 15 deg C  
 90% Maximum pH = 6.7 SU  
 10% Maximum pH = 5.5 SU  
 Discharge Flow = 1 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile <sup>c</sup>	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin <sup>c</sup>	0	3.0E+00	--	na	5.0E-04	8.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	4.05E+01	2.73E+00	na	--	8.1E+01	5.5E+00	na	--	--	--	--	--	--	--	--	--	8.1E+01	5.5E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	4.05E+01	5.12E+00	na	--	8.1E+01	1.0E+01	na	--	--	--	--	--	--	--	--	--	8.1E+01	1.0E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	6.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Anilimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	6.6E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	6.8E+02	3.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene <sup>c</sup>	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benzidine <sup>c</sup>	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis(2-Chloroethyl) Ether <sup>c</sup>	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis(2-Chloroisopropyl) Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoform <sup>c</sup>	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	2.8E+00	9.0E-01	na	--	5.6E+00	1.8E+00	na	--	--	--	--	--	--	--	--	--	5.6E+00	1.8E+00	na	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	8.6E-03	na	1.6E-02
Chloride	0	6.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>c</sup>	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	1.7E-01	8.2E-02	na	--
Chromium III	0	4.5E+02	5.8E+01	na	--	9.0E+02	1.2E+02	na	--	--	--	--	--	--	--	--	--	9.0E+02	1.2E+02	na	--
Chromium VI	0	1.8E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.2E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene <sup>c</sup>	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	3.6E-02
Copper	0	1.0E+01	7.0E+00	na	--	2.0E+01	1.4E+01	na	--	--	--	--	--	--	--	--	--	2.0E+01	1.4E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	4.4E+01	1.0E+01	na	3.2E+04
DDD <sup>c</sup>	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDE <sup>c</sup>	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	4.4E-03
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	2.2E+00	2.0E-03	na	4.4E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	3.4E-01	3.4E-01	na	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
3,3-Dichlorobenzidine <sup>c</sup>	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	5.6E-01
Dichlorobromomethane <sup>c</sup>	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
1,2-Dichloroethane <sup>c</sup>	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
1,2-Trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	5.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane <sup>c</sup>	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
1,3-Dichloropropene <sup>c</sup>	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	4.8E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
2,4-Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	5.6E+02
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	1.0E-07
1,2-Diphenylhydrazine <sup>c</sup>	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Endrin	0	8.8E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	1.7E-01	7.2E-02	na	1.2E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	6.0E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Haptachlor <sup>C</sup>	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	1.6E-03
Haptachlor Epoxide <sup>C</sup>	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	7.8E-04
Hexachlorobenzene <sup>C</sup>	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	5.8E-03
Hexachlorobutadiene <sup>C</sup>	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Hexachlorocyclohexane Alpha-BHC <sup>C</sup>	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	9.8E-02
Hexachlorocyclohexane Beta-BHC <sup>C</sup>	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Hexachlorocyclohexane Gamma-BHC <sup>C</sup> (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	1.9E+00	--	na	3.6E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Hexachloroethane <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	4.0E+00	na	--
Indeno (1,2,3-cd) pyrene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone <sup>C</sup>	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
Kapona	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	6.2E+01	9.3E+00	na	--	1.6E+02	1.9E+01	na	--	--	--	--	--	--	--	--	--	1.6E+02	1.9E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	2.8E+00	1.5E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Methylene Chloride <sup>C</sup>	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	6.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	1.4E+02	1.6E+01	na	4.6E+03	2.8E+02	3.2E+01	na	9.2E+03	--	--	--	--	--	--	--	--	2.8E+02	3.2E+01	na	9.2E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine <sup>C</sup>	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodiphenylamine <sup>C</sup>	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
N-Nitrosodi-n-propylamine <sup>C</sup>	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Nonylphenol	0	2.8E+01	8.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	5.6E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	1.3E-01	2.6E-02	na	--
PCB Total <sup>C</sup>	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.8E-02	na	1.3E-03
Pentachlorophenol <sup>C</sup>	0	2.0E+00	1.6E+00	na	3.0E+01	4.1E+00	3.1E+00	na	6.0E+01	--	--	--	--	--	--	--	--	4.1E+00	3.1E+00	na	6.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	1.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+03
Radionuclides Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	4.0E+01	1.0E+01	na	8.4E+03
Silver	0	2.1E+00	--	na	--	4.2E+00	--	na	--	--	--	--	--	--	--	--	--	4.2E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane <sup>C</sup>	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	--	--	na	8.0E+01
Tetrachloroethylene <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	--	--	na	9.4E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene <sup>C</sup>	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.6E-03	--	--	--	--	--	--	--	--	1.5E+00	4.0E-04	na	5.6E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	9.2E-01	1.4E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
1,1,2-Trichloroethane <sup>C</sup>	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
Trichloroethylene <sup>C</sup>	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	--	--	na	6.0E+02
2,4,6-Trichlorophenol <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
Zinc	0	9.1E+01	9.2E+01	na	2.6E+04	1.8E+02	1.8E+02	na	5.2E+04	--	--	--	--	--	--	--	--	1.8E+02	1.8E+02	na	5.2E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline =  $(0.25(WQC - \text{background conc.}) + \text{background conc.})$  for acute and chronic  
=  $(0.1(WQC - \text{background conc.}) + \text{background conc.})$  for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	1.1E+00
Chromium III	7.0E+01
Chromium VI	1.3E+01
Copper	8.1E+00
Iron	na
Lead	1.1E+01
Manganese	na
Mercury	9.2E-01
Nickel	1.9E+01
Selenium	6.0E+00
Silver	1.7E+00
Zinc	7.3E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

# FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: City of Alexandria CSS Outfall 003

Permit No.: VA0087088

Receiving Stream: Hooffs Run

Version: OWP Guidance Memo 00-2011 (8/24/00)

## Stream Information

Mean Hardness (as CaCO<sub>3</sub>) = 106 mg/L  
 90% Temperature (Annual) = 29 deg C  
 90% Temperature (Wet season) = 20 deg C  
 90% Maximum pH = 7.1 SU  
 10% Maximum pH = 5.6 SU  
 Tier Designation (1 or 2) = 1  
 Public Water Supply (PWS) Y/N? = n  
 Trout Present Y/N? = n  
 Early Life Stages Present Y/N? = y

## Stream Flows

1Q10 (Annual) = 1 MGD  
 7Q10 (Annual) = 1 MGD  
 30Q10 (Annual) = 1 MGD  
 1Q10 (Wet season) = 1 MGD  
 30Q10 (Wet season) = 1 MGD  
 30Q5 = 1 MGD  
 Harmonic Mean = 1 MGD

## Mixing Information

Annual - 1Q10 Mix = 100 %  
 - 7Q10 Mix = 100 %  
 - 30Q10 Mix = 100 %  
 Wet Season - 1Q10 Mix = 100 %  
 - 30Q10 Mix = 100 %

## Effluent Information

Mean Hardness (as CaCO<sub>3</sub>) = 149 mg/L  
 90% Temp (Annual) = 28.8 deg C  
 90% Temp (Wet season) = 15 deg C  
 90% Maximum pH = 7 SU  
 10% Maximum pH = 6 SU  
 Discharge Flow = 1 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile <sup>c</sup>	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin <sup>c</sup>	0	3.0E+00	--	na	5.0E-04	8.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	3.46E+01	2.45E+00	na	--	6.9E+01	4.9E+00	na	--	--	--	--	--	--	--	--	--	6.9E+01	4.9E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	3.46E+01	4.79E+00	na	--	6.9E+01	9.6E+00	na	--	--	--	--	--	--	--	--	--	6.9E+01	9.6E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	6.6E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	6.6E+02	3.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene <sup>c</sup>	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benzidine <sup>c</sup>	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis(2-Chloroethyl) Ether <sup>c</sup>	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis(2-Chloroisopropyl) Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoforn <sup>c</sup>	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	5.2E+00	1.4E+00	na	--	1.0E+01	2.7E+00	na	--	--	--	--	--	--	--	--	--	1.0E+01	2.7E+00	na	--
Carbon Tetrachloride <sup>c</sup>	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	6.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	6.6E-03	na	1.6E-02
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethene <sup>c</sup>	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	1.7E-01	8.2E-02	na	--
Chromium III	0	7.0E+02	9.0E+01	na	--	1.4E+03	1.8E+02	na	--	--	--	--	--	--	--	--	--	1.4E+03	1.8E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.2E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene <sup>c</sup>	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	3.6E-02
Copper	0	1.7E+01	1.1E+01	na	--	3.4E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.4E+01	2.2E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	4.4E+01	1.0E+01	na	3.2E+04
DDD <sup>c</sup>	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDE <sup>c</sup>	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	4.4E-03
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	2.2E+00	2.0E-03	na	4.4E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	3.4E-01	3.4E-01	na	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
3,3-Dichlorobenzidine <sup>c</sup>	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	5.6E-01
Dichlorobromomethane <sup>c</sup>	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
1,2-Dichloroethane <sup>c</sup>	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	5.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane <sup>c</sup>	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
1,3-Dichloropropane <sup>c</sup>	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	4.8E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
2,4-Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	5.6E+02
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	1.0E-07
1,2-Diphenylhydrazine <sup>c</sup>	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	1.7E-01	7.2E-02	na	1.2E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	6.0E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor <sup>C</sup>	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	1.6E-03
Heptachlor Epoxide <sup>C</sup>	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	7.8E-04
Hexachlorobenzene <sup>C</sup>	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	5.8E-03
Hexachlorobutadiene <sup>C</sup>	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Hexachlorocyclohexane																					
Alpha-BHC <sup>C</sup>	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	9.8E-02
Hexachlorocyclohexane																					
Beta-BHC <sup>C</sup>	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Hexachlorocyclohexane																					
Gamma-BHC <sup>C</sup> (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	1.9E+00	--	na	3.6E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Hexachloroethane <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	4.0E+00	na	--
Indeno (1,2,3-cd) pyrene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone <sup>C</sup>	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
Kapone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	1.6E+02	1.8E+01	na	--	3.2E+02	3.7E+01	na	--	--	--	--	--	--	--	--	--	3.2E+02	3.7E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	2.8E+00	1.5E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Methylene Chloride <sup>C</sup>	0	--	--	na	6.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	6.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.2E+02	2.5E+01	na	4.8E+03	4.5E+02	5.0E+01	na	9.2E+03	--	--	--	--	--	--	--	--	4.5E+02	5.0E+01	na	9.2E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine <sup>C</sup>	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodiphenylamine <sup>C</sup>	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
N-Nitrosodi-n-propylamine <sup>C</sup>	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Nonylphenol	0	2.8E+01	6.8E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	5.6E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	1.3E-01	2.6E-02	na	--
PCB Total <sup>C</sup>	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.8E-02	na	1.3E-03
Pentachlorophenol <sup>C</sup>	0	2.5E+00	1.9E+00	na	3.0E+01	5.0E+00	3.8E+00	na	6.0E+01	--	--	--	--	--	--	--	--	5.0E+00	3.8E+00	na	6.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	1.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+03
Radionuclides																					
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	4.0E+01	1.0E+01	na	8.4E+03
Silver	0	5.2E+00	--	na	--	1.0E+01	--	na	--	--	--	--	--	--	--	--	--	1.0E+01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane <sup>C</sup>	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	--	--	na	8.0E+01
Tetrachloroethylene <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	--	--	na	9.4E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene <sup>C</sup>	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.6E-03	--	--	--	--	--	--	--	--	1.5E+00	4.0E-04	na	5.6E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	9.2E-01	1.4E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
1,1,2-Trichloroethane <sup>C</sup>	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
Trichloroethylene <sup>C</sup>	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	--	--	na	6.0E+02
2,4,6-Trichlorophenol <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
Zinc	0	1.4E+02	1.5E+02	na	2.6E+04	2.9E+02	2.9E+02	na	5.2E+04	--	--	--	--	--	--	--	--	2.9E+02	2.9E+02	na	6.2E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.  
Antideg. Baseline =  $(0.25(WQC - \text{background conc.}) + \text{background conc.})$  for acute and chronic  
=  $(0.1(WQC - \text{background conc.}) + \text{background conc.})$  for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	1.6E+00
Chromium III	1.1E+02
Chromium VI	1.3E+01
Copper	1.3E+01
Iron	na
Lead	2.2E+01
Manganese	na
Mercury	9.2E-01
Nickel	3.0E+01
Selenium	6.0E+00
Silver	4.2E+00
Zinc	1.2E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance



# FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: City of Alexandria CSS - Outfall 004

Permit No.: VA0087068

Receiving Stream: Hooffs Run

Version: OWP Guidance Memo 00-2011 (8/24/00)

## Stream Information

Mean Hardness (as CaCO<sub>3</sub>) = 105 mg/L  
 90% Temperature (Annual) = 29 deg C  
 90% Temperature (Wet season) = 20 deg C  
 90% Maximum pH = 7.1 SU  
 10% Maximum pH = 5.6 SU  
 Tier Designation (1 or 2) = 1  
 Public Water Supply (PWS) Y/N? = n  
 Trout Present Y/N? = n  
 Early Life Stages Present Y/N? = y

## Stream Flows

1Q10 (Annual) = 1 MGD  
 7Q10 (Annual) = 1 MGQ  
 30Q10 (Annual) = 1 MGD  
 1Q10 (Wet season) = 1 MGD  
 30Q10 (Wet season) = 1 MGD  
 30Q5 = 1 MGD  
 Harmonic Mean = 1 MGD

## Mixing Information

Annual - 1Q10 Mix = 100 %  
 - 7Q10 Mix = 100 %  
 - 30Q10 Mix = 100 %  
 Wet Season - 1Q10 Mix = 100 %  
 - 30Q10 Mix = 100 %

## Effluent Information

Mean Hardness (as CaCO<sub>3</sub>) = 152 mg/L  
 90% Temp (Annual) = 29.1 deg C  
 90% Temp (Wet season) = 15 deg C  
 90% Maximum pH = 7.3 SU  
 10% Maximum pH = 6.3 SU  
 Discharge Flow = 1 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile <sup>C</sup>	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin <sup>C</sup>	0	3.0E+00	--	na	5.0E-04	6.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	2.99E+01	2.12E+00	na	--	6.0E+01	4.2E+00	na	--	--	--	--	--	--	--	--	--	6.0E+01	4.2E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	2.99E+01	4.47E+00	na	--	6.0E+01	8.9E+00	na	--	--	--	--	--	--	--	--	--	6.0E+01	8.9E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	6.8E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	6.8E+02	3.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene <sup>C</sup>	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benazidine <sup>C</sup>	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis(2-Chloroethyl) Ether <sup>C</sup>	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis(2-Chloroisopropyl) Ether <sup>C</sup>	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate <sup>C</sup>	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoform <sup>C</sup>	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	5.2E+00	1.4E+00	na	--	1.0E+01	2.8E+00	na	--	--	--	--	--	--	--	--	--	1.0E+01	2.8E+00	na	--
Carbon Tetrachloride <sup>C</sup>	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane <sup>C</sup>	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	8.6E-03	na	1.6E-02
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>c</sup>	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	1.7E-01	8.2E-02	na	--
Chromium III	0	7.0E+02	9.1E+01	na	--	1.4E+03	1.8E+02	na	--	--	--	--	--	--	--	--	--	1.4E+03	1.8E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.2E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene <sup>c</sup>	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	3.6E-02
Copper	0	1.7E+01	1.1E+01	na	--	3.4E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.4E+01	2.2E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	4.4E+01	1.0E+01	na	3.2E+04
DDD <sup>c</sup>	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDE <sup>c</sup>	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	4.4E-03
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	2.2E+00	2.0E-03	na	4.4E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	3.4E-01	3.4E-01	na	--
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
3,3-Dichlorobenzidine <sup>c</sup>	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	5.6E-01
Dichlorobromomethane <sup>c</sup>	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
1,2-Dichloroethane <sup>c</sup>	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	5.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane <sup>c</sup>	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
1,3-Dichloropropane <sup>c</sup>	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	4.8E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
2,4-Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.6E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	5.6E+02
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	1.0E-07
1,2-Diphenylhydrazine <sup>c</sup>	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	1.7E-01	7.2E-02	na	1.2E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	6.0E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor <sup>C</sup>	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	1.6E-03
Heptachlor Epoxide <sup>C</sup>	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	7.8E-04
Hexachlorobenzene <sup>C</sup>	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	5.8E-03
Hexachlorobutadiene <sup>C</sup>	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Hexachlorocyclohexane																					
Alpha-BHC <sup>C</sup>	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	9.8E-02
Hexachlorocyclohexane																					
Beta-BHC <sup>C</sup>	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Hexachlorocyclohexane																					
Gamma-BHC <sup>C</sup> (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	1.9E+00	--	na	3.6E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Hexachloroethane <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	4.0E+00	na	--
Indeno (1,2,3-cd) pyrene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone <sup>C</sup>	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
Kapone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	1.6E+02	1.9E+01	na	--	3.3E+02	3.7E+01	na	--	--	--	--	--	--	--	--	--	3.3E+02	3.7E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	2.8E+00	1.5E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Methylene Chloride <sup>C</sup>	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	6.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.3E+02	2.5E+01	na	4.6E+03	4.5E+02	5.0E+01	na	9.2E+03	--	--	--	--	--	--	--	--	4.5E+02	5.0E+01	na	9.2E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine <sup>C</sup>	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodiphenylamine <sup>C</sup>	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
N-Nitrosodi-n-propylamine <sup>C</sup>	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	5.6E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	1.3E-01	2.6E-02	na	--
PCB Total <sup>C</sup>	0	--	1.4E-02	na	8.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.8E-02	na	1.3E-03
Pentachlorophenol <sup>C</sup>	0	2.7E+00	2.0E+00	na	3.0E+01	5.3E+00	4.1E+00	na	6.0E+01	--	--	--	--	--	--	--	--	5.3E+00	4.1E+00	na	6.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	1.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+03
Radionuclides																					
Gross Alpha Activity																					
(pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity																					
(mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	4.0E+01	1.0E+01	na	8.4E+03
Silver	0	5.3E+00	--	na	--	1.1E+01	--	na	--	--	--	--	--	--	--	--	--	1.1E+01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane <sup>C</sup>	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	--	--	na	8.0E+01
Tetrachloroethylene <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	--	--	na	9.4E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene <sup>C</sup>	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.8E-03	--	--	--	--	--	--	--	--	1.5E+00	4.0E-04	na	5.8E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	8.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	9.2E-01	1.4E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
1,1,2-Trichloroethane <sup>C</sup>	0	--	--	na	1.8E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
Trichloroethylene <sup>C</sup>	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	--	--	na	6.0E+02
2,4,6-Trichlorophenol <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
Zinc	0	1.5E+02	1.5E+02	na	2.6E+04	2.9E+02	2.9E+02	na	5.2E+04	--	--	--	--	--	--	--	--	2.9E+02	2.9E+02	na	5.2E+04

#### Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.  

$$\text{Antideg. Baseline} = (0.25(\text{WQC} - \text{background conc.}) + \text{background conc.}) \text{ for acute and chronic}$$

$$= (0.1(\text{WQC} - \text{background conc.}) + \text{background conc.}) \text{ for human health}$$
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	1.7E+00
Chromium III	1.1E+02
Chromium VI	1.3E+01
Copper	1.3E+01
Iron	na
Lead	2.2E+01
Manganese	na
Mercury	6.2E-01
Nickel	3.0E+01
Selenium	6.0E+00
Silver	4.3E+00
Zinc	1.2E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

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Facility = City of Alexandria CSS - Outfall 001

Chemical = Copper

Chronic averaging period = 4

WLAa = 23

WLAc =

Q.L. = 9.4

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 15

Expected Value = 13.2398

Variance = 6.10592

C.V. = 0.186634

97th percentile daily values = 18.3681

97th percentile 4 day average = 15.7058

97th percentile 30 day average = 14.0884

# < Q.L. = 1

Model used = delta lognormal

No Limit is required for this material

The data are:

12  
13  
11  
15  
18  
16  
14  
16  
10  
14  
11  
7.4  
12  
12  
15

8/17/2012 2:52:25 PM

Facility = City of Alexandria CSS - Outfall 001

Chemical = Zinc

Chronic averaging period = 4

WLAa = 210

WLAc =

Q.L. = 83

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 15

Expected Value = 13.2398

Variance = 6.10592

C.V. = 0.186634

97th percentile daily values = 18.3681

97th percentile 4 day average = 15.7058

97th percentile 30 day average = 14.0884

# < Q.L. = 15

Model used = delta lognormal

No Limit is required for this material

The data are:

54

55

39

45

30

69

60

61

26

29

72

50

64

61

72

8/17/2012 4:33:28 PM

Facility = City of Alexandria CSS - Outfall 002

Chemical = Copper

Chronic averaging period = 4

WLAa = 20

WLAc =

Q.L. = 8.1

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 16

Expected Value = 19.8167

Variance = 135.042

C.V. = 0.586410

97th percentile daily values = 48.1376

97th percentile 4 day average = 32.6379

97th percentile 30 day average = 23.8076

# < Q.L. = 1

Model used = delta lognormal

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 20

Average Weekly limit = 20

Average Monthly Limit = 20

The data are:

28

30

30

14

15

12

11

11

9.8

17

17

16

15

17

3.5

73

8/17/2012 4:34:57 PM

Facility = City of Alexandria CSS - Outfall 002

Chemical = Zinc

Chronic averaging period = 4

WLAa = 180

WLAc =

Q.L. = 73

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 15

Expected Value =

Variance =

C.V. =

97th percentile daily values =

97th percentile 4 day average =

97th percentile 30 day average =

# < Q.L. = 15

Model used =

No Limit is required for this material

The data are:

42

41

43

21

42

29

24

31

23

40

35

31

35

49

51



8/17/2012 4:52:20 PM

Facility = City of Alexandria CSS - Outfall 003

Chemical = Copper

Chronic averaging period = 4

WLAa = 34

WLAc =

Q.L. = 13

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 10

Expected Value = 11.3351

Variance = 46.2545

C.V. = 0.6

97th percentile daily values = 27.5830

97th percentile 4 day average = 18.8592

97th percentile 30 day average = 13.6707

# < Q.L. = 7

Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

8

9

6

10

15

12

8

9

19

22

8/17/2012 4:53:36 PM

Facility = City of Alexandria CSS - Outfall 003

Chemical = Zinc

Chronic averaging period = 4

WLAa = 290

WLAc =

Q.L. = 120

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 10

Expected Value =

Variance =

C.V. =

97th percentile daily values =

97th percentile 4 day average =

97th percentile 30 day average =

# < Q.L. = 10

Model used =

No Limit is required for this material

The data are:

50

20

30

30

90

60

50

50

70

80

8/17/2012 4:56:56 PM

Facility = City of Alexandria CSS - Outfall 004

Chemical = Copper

Chronic averaging period = 4

WLAa = 34

WLAc =

Q.L. = 13

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 12

Expected Value = 8.93141

Variance = 28.7172

C.V. = 0.6

97th percentile daily values = 21.7338

97th percentile 4 day average = 14.8600

97th percentile 30 day average = 10.7717

# < Q.L. = 10

Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

6

6

5

7

8

13

12

6

9

7

18

5

8/17/2012 4:57:59 PM

Facility = City of Alexandria CSS - Outfall 004

Chemical = Zinc

Chronic averaging period = 4

WLAa = 290

WLAc =

Q.L. = 120

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 12

Expected Value = 66.5286

Variance = 1593.38

C.V. = 0.6

97th percentile daily values = 161.891

97th percentile 4 day average = 110.689

97th percentile 30 day average = 80.2370

# < Q.L. = 11

Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

10  
10  
200  
50  
50  
50  
40  
50  
40  
70  
40  
20

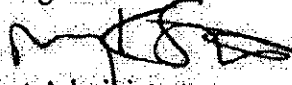


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

APR 20 2011

MEMORANDUM

**SUBJECT:** Protecting Water Quality with Green Infrastructure in EPA Water Permitting and Enforcement Programs

**FROM:** Nancy Stoner   
Acting Assistant Administrator  
Office of Water (OW)

Cynthia Giles   
Assistant Administrator  
Office of Enforcement and Compliance Assurance (OECA)

**TO:** EPA Regional Administrators, OW & OECA Office & Division Directors

The United States Environmental Protection Agency (EPA) strongly encourages and supports the use of green infrastructure approaches to manage wet weather through infiltration, evapotranspiration, and rainwater harvesting. As stated in previous memoranda, EPA recognizes that green infrastructure can be a cost-effective, flexible, and environmentally-sound approach to reduce stormwater runoff and sewer overflows and to meet Clean Water Act (CWA) requirements. Green infrastructure also provides a variety of community benefits including economic savings, green jobs, neighborhood enhancements and sustainable communities. The benefits of green infrastructure are particularly enhanced in urban and suburban areas where green space is limited and environmental damage may be more extensive. The Office of Water (OW) and the Office of Enforcement and Compliance Assurance (OECA) are committed to working with interested communities and water resource managers to successfully incorporate green infrastructure into National Pollutant Discharge Elimination System (NPDES) permits, as well as remedies designed to address non-compliance with the CWA, to better manage both stormwater runoff and sewer overflows.

Given the multiple benefits associated with green infrastructure, EPA encourages the use of green approaches to stormwater runoff and sewer overflow management to the maximum extent possible. Green practices reduce stormwater runoff, preventing it from entering combined and separate sanitary sewer systems and reducing the volume and occurrence of overflows.

<sup>1</sup> "Using Green Infrastructure to Protect Water Quality in Stormwater, CSO, Nonpoint Source and other Water Programs" signed by Benjamin Grumbles, Assistant Administrator, Office of Water, on March 5, 2007, and "Use of Green Infrastructure in NPDES Permits and Enforcement" signed by Linda Boornazian, Director, Water Permits Division and Mark Pollins, Director, Water Enforcement Division, on August 16, 2007.

Green practices also lower the amount of untreated stormwater discharging to surface waters. Green infrastructure provides additional green spaces and recreational opportunities, enhanced ecosystem services, improved air quality, increased property values, energy savings, economic development, reduced urban heat island effects, and job creation opportunities. In addition, green infrastructure can serve as both a climate change mitigation and adaptation strategy, through increased carbon sequestration from plants and soils, and flexibility in adjusting to potential changes in precipitation patterns. As a result of these benefits, communities around the country are increasingly incorporating green designs into wet weather controls through both NPDES permits and water enforcement agreements.

Tremendous progress has been made in recent years on models and technical approaches to assist communities with green infrastructure planning, making it easier for communities to demonstrate that green infrastructure solutions meet CWA requirements. CWA NPDES permits and enforcement agreements that incorporate green or gray infrastructure solutions require enforceable performance criteria, implementation schedules, monitoring plans and protocols, progress tracking and reporting, and operation and maintenance requirements. Regardless of the technology used, EPA looks for a demonstration of sound modeling and technical approaches as well as planning for overall wet weather control approaches to satisfy regulatory requirements. EPA will continue to increase its efforts to help interested communities ensure that green infrastructure meets CWA requirements as well as community goals and encourages communities to consider green infrastructure in all wet weather control plans.

In November 2010, EPA Deputy Administrator Bob Perciasepe formed a cross-agency green infrastructure Steering Committee and Work Group comprised of representatives of each region and every Assistant Administrator's office to further encourage and support the implementation of green infrastructure solutions. As part of this effort, EPA will continue to work with other federal agencies, state and local governments, tribes, municipalities, and the private sector to identify opportunities and provide technical assistance to communities implementing green approaches to control wet weather. EPA will also provide additional tools to encourage states and communities to leverage green infrastructure opportunities within other innovative environmental projects.

We encourage you and your staff to contact OW's Green Infrastructure Coordinator, Chris Kloss at [kloss.christopher@epa.gov](mailto:kloss.christopher@epa.gov) and OECA's Green Infrastructure Coordinator, Mahri Monson at [monson.mahri@epa.gov](mailto:monson.mahri@epa.gov) with questions, comments and information on green infrastructure in permitting and enforcement. Attachment A to this memorandum contains some recent examples of successful incorporation of green infrastructure into NPDES permits and enforcement actions. Attachment B lists the green infrastructure regional liaisons for both the water and the enforcement programs.

Cc: Regional Permit and Enforcement Liaisons

Attachments

## Attachment A

### Recent Examples of Green Infrastructure in Permits and Enforcement Actions

#### **Stormwater Permitting Approaches with Green Infrastructure**

**California** - Since May 2009, California Regional Water Quality Control Boards have adopted nine Phase I MS4 permits requiring that new development and redevelopment projects retain the 85<sup>th</sup> percentile storm event via infiltration, evapotranspiration, and rainwater harvest and reuse by utilizing green infrastructure practices. Within the individual permits, there are provisions that allow for off-site mitigation or payment of fees if retention and biofiltration are not technically feasible on site.

**Charles River Watershed, MA** - The draft Residual Designated Discharge General Permit has been developed and noticed for the communities of Milford, Bellingham and Franklin, Massachusetts. The draft permit proposes stormwater control requirements to reduce phosphorus loading for properties with two or more acres of impervious area and the use of infiltration/recharge practices to achieve the required phosphorus load reduction for a property if it is determined that such practices are technically feasible.

**Massachusetts** - EPA's draft small MS4 general permit for Massachusetts encourages the use of practices which capture (infiltrate, evapotranspire, and/or harvest and reuse rainwater) the 90<sup>th</sup> percentile storm event (1 inch storm). The draft permit also requires municipalities to examine existing guidelines and policies for their ability to support green infrastructure options in new development and redevelopment, identify impediments, and determine what changes need to be made.

**Santa Monica, CA** - In July 2010, the City updated its Urban Runoff Pollution Ordinance to require that new development and redevelopment projects infiltrate, store for non-potable use, or evapotranspire the first ¾ inch of a storm, or pay an Urban Runoff Reduction fee that the City then uses for larger scale stormwater control projects. The ordinance promotes the use of green infrastructure for meeting the stormwater retention requirements.

**Washington, DC** - The District's draft MS4 permit includes a development retention standard of 1.2 and 1.7 inches for non-federal and federal properties, respectively, along with numeric targets for green roofs (350,000 square feet over the permit cycle on District properties) and tree canopy (4,150 trees per year and 13,500 by 2014). The draft DC MS4 permit built off of a supplement to the previous permit that identified numeric targets for tree canopy, LID projects (17 by August 2009), rain gardens (50 by December 2009), rain barrels (125 by December 2009), and downspout disconnection (200 by December 2009).

#### **Enforcement Actions with Green Infrastructure**

**Cincinnati, OH** - Cincinnati's 2004 consent decree (CD) to control sewer overflows was amended in 2010, providing opportunities to incorporate green infrastructure solutions by

substituting “green for grey” on a project by project basis. The city is currently evaluating potential green infrastructure projects and has a three year study and detailed design period to examine green solutions in the Lick Run Watershed, in Mill Creek Valley on the west side of Cincinnati. One promising project in the Lick Run drainage area, a corridor that includes an environmental justice community, would remove storm water flows from the combined sewer system and create a new above-ground drainage feature with surrounding park land. Cincinnati will be meeting with EPA throughout 2011 to discuss green infrastructure plans, and proposals for “green for grey” substitutions are likely to be submitted in 2012.

**Cleveland, OH** - The 2010 Cleveland, OH, CD requires that green infrastructure be used to capture 44 million gallons of combined sewer overflow discharge in order to clean up Cleveland’s waters. The city agreed to spend at least \$42 million on green infrastructure and will conduct a feasibility study to develop a green infrastructure plan to meet the 44 million gallon reduction requirement. The agreement allows Cleveland to submit plans for additional green infrastructure controls, based on the results of initial projects. The city will target the majority of its green infrastructure projects in low-income and minority concentrated neighborhoods, where there is an abundance of vacant land that can be utilized at a relatively low cost. The residents of Cleveland will benefit from reduction of sewer overflows and their associated health hazards, increased green space and recreational opportunities, increased property values and job opportunities.

**Kansas City, MO** - EPA and Kansas City, Missouri signed a consent decree in May 2010 which requires the city to use green infrastructure to help control and eliminate sewer overflows. Kansas City will initially implement a green infrastructure plan to control wet weather flows in a 744-acre environmental justice neighborhood, with the option to expand green infrastructure programs throughout the city to help keep sewer overflows from polluting the community’s water. Green infrastructure technologies to be implemented include catch basin retrofits in road and street rights-of-way, curb extension swales, street trees, permeable pavement, green roofs and stormwater planters. Thanks to this agreement, the citizens of Kansas City will benefit from improvements in water quality, air quality, and new green spaces throughout the city.

**Louisville, KY** - Through an agreement with EPA filed in 2005 and amended in 2009, Louisville, Kentucky is using green infrastructure to help solve the city’s sewer overflow problems. Louisville has committed to constructing 19 initial green infrastructure demonstration projects including green roofs, green streets, urban reforestation, and other green elements to keep polluted runoff from entering their waters. After a six-year study period to monitor demonstration projects, the sewer department may propose additional green infrastructure controls. Louisville’s sewer department has already distributed hundreds of rain barrels to residents throughout the city, providing citizens the opportunity to participate in cleaning up their waters. The community at large will continue to benefit from ongoing installment of rain gardens, permeable parking lots, and other green amenities throughout Louisville.



Attachment B

Regional Green Infrastructure Liaisons

<b>Region</b>	<b>Water Program Green Infrastructure Liaisons</b>	<b>Enforcement and Compliance Green Infrastructure Liaisons</b>
<b>1</b>	Johanna Hunter	Joy Hilton Jeff Kopf
<b>2</b>	Jeff Gratz	Murray Lantner
<b>3</b>	Dominique Lueckenhoff	Allison Graham
<b>4</b>	MaryAnn Gerber Darryl Williams	Araceli Bonilla
<b>5</b>	Bob Newport	Jonathan Moody
<b>6</b>	Brent Larsen Suzanna Perea	Diana McDonald
<b>7</b>	Kerry Herndon Mandy Whitsitt	Jodi Bruno
<b>8</b>	Stacey Eriksen	David Gwisdalla
<b>9</b>	John Kemmerer	Michelle Moustakas
<b>10</b>	Krista Mendelman	Rob Grandinetti




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OCT 27 2011

**MEMORANDUM**

**SUBJECT:** Achieving Water Quality Through Integrated Municipal Stormwater and Wastewater Plans

**FROM:** Nancy Stoner   
Acting Assistant Administrator  
Office of Water (OW)

Cynthia Giles   
Assistant Administrator  
Office of Enforcement and Compliance Assurance (OECA)

**TO:** EPA Regional Administrators, OW & OECA Office & Division Directors

One of the most basic objectives of the Clean Water Act (CWA) is to keep raw sewage and pollutants carried by stormwater out of our nation's waters. We have made tremendous strides towards achieving that objective, but much work remains to be done. As we move forward with our work, we must be mindful that many of our state and local government partners find themselves facing difficult financial conditions. Their ability to finance improvements by raising revenues or issuing bonds has been significantly impacted during the ongoing economic recovery. We write this memorandum to make sure that we proceed as one EPA to assure that we work with states and communities to get the most effective as well as cost-effective approaches for meeting our shared objective of clean water that protects public health and the environment.

**Integrated Planning for Cost-Effective Solutions**

Today, the EPA, states and municipalities often focus on each CWA requirement individually for protecting water quality. As a result, we sometimes assess and implement the best alternative to solve one problem at a time without full consideration of all CWA obligations. This approach may have the unintended consequence of constraining a municipality from implementing the most cost-effective solutions in a sequence that addresses the most serious water quality issues first. We encourage regions to work with the states to engage our local partners regarding all of their National Pollutant Discharge Elimination System (NPDES) related obligations in an orderly manner. A comprehensive and integrated planning approach to a municipal government's CWA waste- and storm-water obligations offers the greatest opportunity for identifying cost-effective and protective solutions and implementing the most important projects first. The CWA and its implementing regulations, policy and guidance provide us

with the necessary flexibility to work with communities to utilize comprehensive integrated planning to prioritize its waste- and storm-water investments.

Integrated planning will put municipalities on a critical path to achieving the water quality objectives of the CWA by identifying efficiencies in implementing sometimes overlapping and competing requirements that arise from separate waste- and storm-water programs, including how best to make capital investments and meet operation and maintenance requirements. Integrated planning also can lead to the identification of sustainable and comprehensive solutions, such as green infrastructure, that improve water quality as well as support other quality of life attributes that enhance the vitality of communities.

In embracing an integrated approach to waste- and storm-water management we are not suggesting that existing regulatory or permitting standards that protect public health and water on which communities depend be lowered. Rather, we are simply suggesting that such an approach will help municipalities responsibly meet their CWA obligations by maximizing their infrastructure improvement dollars through the appropriate sequencing of work. This will require coordination between permit and enforcement actions and complementary state actions. In so doing, as we consider a particular municipality's financial ability to complete the required infrastructure improvement work we must be sure that we consider all of its CWA obligations. EPA's existing regulations and policies provide EPA and states flexibility to evaluate a municipality's financial capability in tough economic times and to set appropriate compliance schedules, allow for implementing innovative solutions and sequence critical waste- and storm-water capital projects and operation and maintenance related work in a way that ensures human health and environmental protection. We recognize that such an integrated approach will necessarily involve balancing all of a municipality's competing CWA priorities with the public health and welfare objectives of the CWA. In doing so, we must be diligent in ensuring that a municipality be positioned to address its most pressing public health and welfare issues first.

States and local governments share our commitment to protecting public health and welfare. As an initial step towards meeting this shared commitment, the Office of Water and Office of Enforcement and Compliance Assurance are developing an integrated planning approach framework to help EPA, including its regional offices, work with state and local governments toward cost-effective decisions. The framework will identify: 1) the essential components of an integrated plan; 2) steps for identifying municipalities that might make best use of such an approach; and 3) how best to implement the plans with our state partners under the CWA permit and enforcement programs.

Once the framework is in draft form we want to begin discussions and hold meetings with states and local governments, utilities and environmental groups to obtain their feedback on the draft framework in the coming months. In addition, we hope to identify municipal leaders who are currently developing, or have developed, integrated plans that can serve as models for this work.

### Green Infrastructure

As you know, given the multiple benefits associated with green infrastructure, EPA strongly encourages the use of green infrastructure and related innovative technologies, approaches, and practices to manage stormwater as a resource, reduce sewer overflows, enhance environmental quality, and achieve other economic and community benefits. Many cities and communities in the United States are now

employing green infrastructure practices and know the value of such projects to not only protect water resources, but also to bring opportunities for greenways and multiuse recreational areas, improving property values, saving energy and creating green jobs.

In April of this year, we released our new green infrastructure strategic agenda, which outlines the activities that we will undertake to help communities implement green infrastructure approaches. Our strategy aims to clarify and advance the wider utility of green infrastructure within the regulatory and enforcement contexts through improvements in outreach and information exchange, financing, and tool development and capacity building.

Over the past several years, we have been working closely with state and local governments to incorporate green infrastructure approaches to water quality within permits and enforcement actions. We have many successful examples of cities who will utilize green infrastructure to meet regulatory requirements while also benefiting from green jobs, neighborhood enhancements and more sustainable communities. We have also launched a community partnership program that has currently identified 10 communities with which the Agency will work on green infrastructure implementation issues. The Agency hopes to add up to an additional 20 communities in the future. We have also started to develop technical assistance resources for some of these communities on using green infrastructure on brownfield sites and slowly infiltrating soils and evaluating codes and ordinances for barriers. All of these green infrastructure and associate innovations are important tools that will be fundamental aspects of the integrated waste- and storm-water planning solutions we envision.

We have the tools in our existing regulations and guidance to find answers to these problems. The current economic times make the need for sensible and effective approaches even more pressing. We have already seen the benefits that leadership and creativity in the regions' work bring to resolving these issues, reflected in forward looking plans in Indianapolis, Cleveland, St. Louis and many others. We look forward to working with you, and with states and local communities, to continue to pursue innovative and cost effective solutions to our water quality challenges.

We encourage you and your staff to contact Deborah Nagle, Director, Water Permits Division ([nagle.deborah@epa.gov](mailto:nagle.deborah@epa.gov)) and Mark Pollins, Director, Water Enforcement Division ([pollins.mark@epa.gov](mailto:pollins.mark@epa.gov)) with any questions you might have.

Cc: Regional Permit and Enforcement Liaisons

Public Notice -- Environmental Permit

**PURPOSE OF NOTICE:** To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of overflows from a combined sewer system during wet weather events into three water bodies in Alexandria, Virginia.

**PUBLIC COMMENT PERIOD:** July 12, 2013 to August 12, 2013

**PERMIT NAME:** Virginia Pollutant Discharge Elimination System Permit -- issued by DEQ, under the authority of the State Water Control Board.

**APPLICANT NAME, ADDRESS AND PERMIT NUMBER:** City of Alexandria  
301 King Street, Room 4100, Alexandria, VA 22313  
VA0087068

**NAME AND ADDRESS OF FACILITY:** Alexandria Combined Sewer System  
Alexandria, VA 22313

**PROJECT DESCRIPTION:** The City of Alexandria has applied for reissuance of a permit for the public Alexandria Combined Sewer System. The applicant proposes to release combined sewer system overflows during wet weather events at an estimated annual volume of 112.8 million gallons into three water bodies. There is no sludge generated by this system. The facility proposes to release combined sewer system overflows during wet weather events in the Hooffs Run, Hunting Creek and Oronoco Bay in Alexandria in the Potomac River watershed. A watershed is the land area drained by a river and its incoming streams. The permit requires monitoring of the following pollutants: pH, carbonaceous-Biochemical Oxygen Demand, Total Suspended Solids, Dissolved Oxygen, Total Kjeldahl Nitrogen, Ammonia, E. coli, Nitrate+Nitrite, Total Nitrogen, Total Phosphorus, Chlorides, Total Recoverable Zinc, and Total Recoverable Copper.

**HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING:** DEQ accepts comments and requests for public hearing by email, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

**CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION:** The public may review the documents at the DEQ-Northern Regional Office by appointment or may request electronic copies of the draft permit and fact sheet.

Name: Douglas Frasier

Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193

Phone: (703) 583-3873 Email: Douglas.Frasier@deq.virginia.gov Fax: (703) 583-3821

**Attachment 18**  
**City of Alexandria Combined Sewer System**  
**VA0087068**

**Draft Permit Response to Comments Document**

**Introduction**

This document serves as the Northern Regional Office's response to comments received during the public comment period associated with the draft permit. A list of commenters, their method of submission, the date comment letters were received by the regional office and staff responses pertaining to those submissions are provided on pages 4 through 10.

The format of this comment response document, found on pages 4 through 10, presents the actual comment as it was submitted to DEQ followed by staff's response. Similar comments, or those addressing similar comments, were consolidated for staff response.

During the draft permit public comment period, the Northern Regional Office received comments from the Friends of Dyke Marsh via Glenda Booth, President and Potomac Riverkeepers via Robin Broder, Vice President. Neither organization requested a public hearing; rather, looking forward to working with the City during the development of the Long Term Control Plan Update.

## Table of Contents

<b>List of Commenters .....</b>	<b>3</b>
<b>Issue Based Comment Summary .....</b>	<b>4</b>

**List of Commenters****Letters Submitted During Public Comment Period  
12 July 2013 – 12 August 2013**

<b>Commenter</b>	<b>Mode of Submittal</b>	<b>Date Received</b>	<b>Staff Comments</b>
Friends of Dyke Marsh via Glenda Booth, President	Email	12 August 2013	
Potomac Riverkeeper Via Robin Broder, Vice President	Email	12 August 2013	



**Public Comment #1:**

- a. Our overriding comment is that it is simply unacceptable to allow any amount of untreated sewage to enter the waterways from the city of Alexandria or any source in the 21<sup>st</sup> century. While the permit application and the LTCP contain mitigation projects and practices to reduce the amount of combined sewer overflows, they do not contain plans that would lead to eliminating the discharge of untreated sewage.
- b. Potomac Riverkeeper's believes that it is unacceptable to allow any amount of untreated sewage to enter the waterways from the City of Alexandria's CSS or any other source. While the permit application and the LTCP contain mitigation projects and practices to reduce the amount of combined sewer overflows, they do not contain the goal of eliminating entirely the introduction of untreated sewage.

**Staff Response:**

These legacy systems, installed in the mid to late 1800's, are found in many areas of the United States. Each system presents its own challenges and complexities as localities continue to address the impacts. This draft permit reflects the CSO Control Policy; allowing the City to explore value-engineered solutions to comply with applicable water quality standards. Staff anticipates that a complimentary approach involving gray and green engineering projects will be embarked to (1) satisfy the reductions necessary under the Hunting Creek Bacteria TMDL, (2) improve overall water quality and (3) minimize downstream impacts. Please refer to Section 21.d of the Fact Sheet for a more detailed explanation.

**Public Comment #2:**

- a. The permit and fact sheet contain little information on the impacts of combined sewer overflows and pollution on downstream wildlife and human health. While perhaps beyond the scope of normal permitting practices, we believe that downstream impacts on water quality and natural resources are quite serious, adverse and should be evaluated.
- b. The permit application contains little information on the impacts of combined sewer overflows and pollution on downstream wildlife and human health. While the focus of the permit is on Hunting Creek Bacteria TMDL compliance, we believe that downstream impacts are quite serious and adverse on sensitive areas such as Dyke Marsh and should be evaluated, particularly the control of solid and floatable materials.

**Staff Response:**

One of the procedures staff completes while drafting a discharge permit is to evaluate and determine if a reasonable potential exists that the discharge(s) could impact the receiving stream based on the characteristics of the discharge. This exercise takes into account not only the immediate receiving stream but also possible downstream impacts. Attachment 14 of the Fact Sheet illustrates this analysis and Section 15 of the Fact Sheet notes any downstream impairments that may exist which are taken into account during development of the permit.

Please see Comment #5 and subsequent staff response regarding solid and floatable materials.

**Public Comment #3:**

- a. Section E.4 of the draft permit requires the city to develop and complete implementation of the Long Term Control Plan Update for the Hunting Creek Bacteria TMDL "as soon as practicable" but no later than Dec. 31, 2035," 32 years from now. The city's first LTCP was approved by DEQ in February 1999.

The Friends of Dyke Marsh believe that taking 32 years to eliminate combined sewer overflows is far too long. A more aggressive schedule is needed, given the frequency of events and the very small amounts of rainfall or snowmelt that can cause overflows, as discussed in comment 6 below. In addition, many studies show that as the climate warms, intense weather events like severe storms and hurricanes, will become more numerous and more frequent, further burdening the sewer system and exacerbating overflows.

- b. We are encouraged that the City of Alexandria will be developing an updated LTCP to achieve compliance with the Hunting Creek Bacteria TMDL within three years of issuance of the permit and will allow for public participation during its development. We support the City's plan to include target for Outfall 001 even though it does not fall within the TMDL, and we urge the City to aim for a 99% reduction target. We also urge the City to review the 80% reduction target for Outfall 002 and instead have a target of 99%, the same as Outfalls 003 and 004.

We request that the City reduce the "no later" date for compliance of December 31, 2035. An expedited schedule is needed, given the increased frequency of events and the very small amounts of rainfall or snowmelt that can cause overflows. In addition, many studies demonstrate that as the climate becomes warmer, intense weather events such as severe rain and snow storms and hurricanes will become more frequent, further burdening stormwater and sewer systems.

***Staff Response:***

The regulatory approach incorporated into the draft permit includes both near and long term requirements, each with associated goals and outcomes. DEQ supports this path forward as it both achieves short term results, while also ultimately ensuring compliance with water quality standards. Once finalized, the LTCPU will be required to be fully implemented in less than 20 years, not 32 years as noted above, in order to meet the 2035 compliance date.

Please refer to the Fact Sheet, Page 12, Section 21.d for details on the LTCPU. It is staff's best professional judgement that this time frame is justified given the system's complexities. This is a highly developed, densely populated area presenting challenges that other systems across the nation face with legacy combined sewer systems. Integrated gray and green engineering projects require extensive engineering evaluation, planning and implementation, even for this relatively small system. CSO Control Policy, Section II.C.5 does allow for appropriate cost/performance considerations to help guide the selection of controls.

This general regulatory approach to incorporate green infrastructure and integrate stormwater and wastewater controls is consistent with the approaches encouraged by EPA in memorandum's published in 2011 (see Fact Sheet Attachments 15 & 16).

DEQ staff will forward your comments to the City regarding an expeditious compliance schedule for their consideration.

**Public Comment #4:**

- a. Section E.8.b of the draft permit says the "permittee shall study, implement and promote green infrastructure projects..."

While the city may need to identify appropriate sites, the Friends of Dyke Marsh believe further study of "green infrastructure" or low-impact development approaches is unnecessary and will delay implementation. Green infrastructure is becoming more common and many examples exist across the U.S. that the city of Alexandria should adopt and implement, including Fairfax County, the District of Columbia, Chicago and Portland, Oregon.

- b. While implementation of green infrastructure or low-impact development should be required to decrease stormwater discharges, it is not a substitute for measures that eliminate sewer overflows. As presented in the CSS Permit Fact Sheet (p.2-3), the "minimum rainfall for overflow event" amounts are quite small, at 0.03, 0.06, 0.16, and 0.21 inches. As a result, 139 overflow events in 2011 discharged nearly 113 million gallons into Hunting Creek and the Potomac. Since the minimum rainfall for an overflow event is quite low, the priority should be on disconnecting the sewer system from the CSS. In addition, we support the City's plan to implement improvements at Outfalls 003 and 004 on or before 30 months of the permit effective date.

The permit applications states that the "permittee shall study, implement and promote green infrastructure within the CSS watershed." We would like clarification on what is to be included in the "study."

We believe that the effectiveness of green infrastructure and low-impact development is well studied and documented and the focus should be on development and implementation.

- c. We support the green initiatives and other mitigation approaches that we hope will reduce the amount of water flowing into the storm sewers. We note, however, that very little rainfall or snow melt is required to trigger an overflow event. As presented in the CCS Permit Fact Sheet (p. 2-3), the "minimum rainfall for overflow event" amounts are quite small, at 0.03, 0.06, 0.16, and 0.21 inches. As a result, 139 overflow events were expected during 2011, apparently according to models, that put nearly 113 million gallons of overflow into Hunting Creek and the Potomac.

At an August 5 meeting of the Alexandria Environmental Policy Commission, Mr. William J. Skrabak, Deputy Director of the city's Office of Environmental Quality, was clear, that, in his words, "most rainfall events" cause overflow. He said that "the system cannot carry anything more than a slight drizzle."

It seems unlikely that the mitigation measures listed in the current draft permit will have a significant impact in reducing overflows.

***Staff Response:***

As stated in the Fact Sheet, Section 10, combined sewer overflows are the result of wet weather events. This permit term requires the City to evaluate and implement green infrastructure projects to reduce the amount of stormwater entering the sewer system; thus, reducing the total volume of overflows. In addition, installation of these controls will have benefits outside the scope of this permit. These controls will be applied and evaluated throughout the sewershed at City facilities and other areas as appropriate.

Green infrastructure, while becoming common in other areas of the nation, requires careful and diligent engineering and planning. Factors such as climate, soils, location and maintenance determine the types of systems that may be utilized to obtain optimal performance.

**Public Comment #5:**

Section D.6 of the draft permit states that "the permittee shall continue to implement measures to control solid and floatable materials in the CSS," including "consideration" of entrapment and baffling devices to reduce discharges of solids and floatable materials.

The Friends of Dyke Marsh believe that "consideration" is too weak a requirement. Floatable materials -- cans, bottles, plastics, cigarette butts, trash of all kinds and other debris -- are widespread and common in the wetland and in Hunting Creek, clearly evident in a low-tide visit to the Hunting Creek Bridge on the George Washington Parkway or any visit to Dyke Marsh or the Potomac River shoreline in Fairfax County. The mudflats on both the creek and Potomac sides of the bridge, prominent feeding areas for shorebirds, egrets, herons, turtles and other species, are littered with debris.

Twice a day the tide washes up debris into Dyke Marsh and debris flows from Washington, D.C., Alexandria and boaters into Dyke Marsh. Among other concerns, we know that small animals can become trapped in cans and bottles. Fish, birds and other animals mistake cigarette butts for food. Plastic items rarely biodegrade. Animals mistake plastic and Styrofoam debris, especially small pieces, for food. Birds become entangled in six-pack rings. Animals can suffocate or choke when caught in plastic bags.

Trash from the Potomac can enter the Chesapeake Bay and the Atlantic Ocean, endangering freshwater and marine wildlife that may ingest or become entangled in the debris, resulting in injury or death.

The Alice B. Ferguson Foundation, which organizes annual cleanups in the Potomac watershed, collected 312 tons of trash to date in 2013. While Alexandria constitutes a small portion of the watershed, the city's contribution seems to be concentrated in Hunting Creek and comes mainly from storm sewers. Members of the Friends of Dyke Marsh members engage in cleanups and report Hunting Creek as a rich source of debris of all kinds.

***Staff Response:***

The referenced permit language is found in EPA guidance documents for Combined Sewer Overflows and is consistent with the CSO Control Policy which is the national framework for these types of systems. As noted during the 5 August 2013 public meeting and in the Draft permit, the City is required to conduct regularly, scheduled street cleaning within the CSS sewershed. The rotation and frequency of cleaning have been determined by the amount of trash noted during past cleanings. Documentation is submitted with each annual report.

**Public Comment #6:**

Section D.8.a requires that "identification signs at all CSS outfalls are maintained and easily readable by the public."

While signs are currently posted, the wording on these signs is somewhat misleading. The wording is, in part, "Combined stormwater and sanitary sewage may be discharged at this location during and after heavy or long rain events." According to data on the minimum rainfall needed to cause an overflow event (see comment 6 below), the terms "heavy" and "long" are misleading because according to the Fact Sheet, rainfall from 0.03 to 0.21 inches could lead to overflows. The current signs may lead citizens to misunderstand the likelihood of an overflow.

In addition, some of the signs are not easily readable by the public:

- The signs should stand at eye level. Two signs are too high to be easily read or even noticed by the public: the sign at Outfall 001 (Oronoco Bay) is eight feet four inches high (measured from boardwalk level to top of sign) and the sign for Outfalls 003/004 on the walkway along Holland Lane is nine feet two inches high (measured from ground to top of sign). Besides being too high, the Holland Lane sign is parallel rather than perpendicular to the path and thus not noticeable to walkers.
- The sign for Outfalls 003/004 along the path between Jamieson Avenue and Duke Street is barely visible through the vegetation inside the pathway railing. While we believe signs should be visible to the public, we hope you will try to preserve native plants in the area, like milkweed, the host plant for several butterfly species that are declining.

There is no sign on the east side of Hooff's Run in the area where the Run is accessible.

We also hope you will consider making the signs bilingual, in English and Spanish, given the area's growing Hispanic population.

***Staff Response:***

Please refer to the Draft permit, Part I.E.5.c.; during this permit term, the City is required to install universal signage, approved by DEQ-NRO staff, by 31 December 2013 at each of the outfalls.

DEQ staff will forward comments concerning the height/visibility of the signs to the City for their consideration.

**Public Comment #7:**

Overflow event data are presented in the CCS Permit Fact Sheet (p. 4, Table 1). These data are out of date. The table notes that these data are either "Approximations; per permit application, dated 8 July 2011, for the time period of June 2010 – May 2011, or 2011 Annual Report Model Summary data." Given the monitoring described in the permit, more recent and some observation-based data should be provided, especially for the number of overflow events.

***Staff Response:***

Staff utilized the most current data available at the beginning of this process. This reissuance has been delayed for one year as proposed permit conditions and requirements were discussed and finalized. It is staff's best professional judgement that the model summaries utilized in the Fact Sheet are still representative of the system.

**Public Comment #8:**

Information on progress in achieving the Hunting Creek TMDL is difficult for the public to access online. For example, the 2011 Combined Sewer System Annual Report for 2011 contains appendices showing sampling results for Hunting Creek and Oronoco Bay. These data are point-in-time data and do not indicate trends over time. The CSS Permit Fact Sheet may contain this information in appendices, but pages 46 through the end are illegible.

The annual report required in Section E.5.a of the draft permit should contain information on trends in bacterial levels and other measures, and progress toward meeting the TMDL in language that the average person can understand. Trend data is critical in knowing how and whether water quality is improving or not.

***Staff Response:***

The implementation plan for the Hunting Creek Bacteria TMDL has not been developed; therefore, there is no trend data to measure progress. The City's combined sewer system is only one of many components included in the TMDL. For this reason, staff does not feel that the City should monitor and report bacteria trends in Hunting Creek. The focus of this discharge permit concerns the combined sewer system and its progress towards complying with the assigned bacteria wasteload allocations.

Water quality data for Hunting Creek, including bacteria data, are collected by DEQ at the George Washington Memorial Parkway bridge. These data are evaluated periodically as published in the biennial Integrated Report and are available from DEQ upon request.

**Public Comment #9:**

Section E.5.a of the draft permit requires the city to "publish the annual reports on the City's website and retain the reports on the website for a period of no less than two years."

Currently, we are unable to find an annual report on the city's website. The 2011 report, the 17<sup>th</sup> such report, is posted on the VDEQ website, although it is somewhat difficult to locate. According to August 2013, email communications with a city official, the 2012 annual report was completed in March 2013, but is not currently available on the city's website. A hard copy of the report can be viewed by appointment, thus making access cumbersome and limited.

The permit should require that annual reports be posted on the city of Alexandria website as soon as they are completed and be retained on the site a longer period. At a minimum, the three most recent reports should be retained on the site.

***Staff Response:***

This Draft permit contains the first requirement in which the City will post the annual reports for public access (Part I.E.5). Previous permit terms did not include this requirement; thus, the City is not required by DEQ to post previous annual reports on their website. The first annual report that is required to be posted on the website is for calendar year 2013.

It is staff's best professional judgement that the reports be uploaded to the City's website after DEQ review and comment and that the retention requirement of two years is sufficient.

**Public Comment #10:**

The Fact Sheet (p. 7) provides information on threatened or endangered species that are in the vicinity of the discharges from the combined storm and sanitary sewers:

“The following threatened and endangered species were identified within a 2 mile radius of the outfalls: Brook Floater (mussel); Grizzled Skipper (butterfly); Bald Eagle; and Migrant Loggerhead Shrike (song bird).”

This information does not appear to be accurate or current. We urge DEQ to use accurate and more current data. Also, we recommend that scientific names also be included in the description of threatened and endangered species, as common names are variable.

Concerning the loggerhead shrike, the Virginia Society of Ornithology has documented a precipitous decline of this species. No loggerhead shrike has been reported in Alexandria or in Dyke Marsh for at least 50 years, according to experienced bird watchers in the area.

The bald eagle is no longer listed as a federally-endangered species, having been removed from the list by the U.S. Fish and Wildlife Service in 2007. However, the bald eagle remains protected by federal law. Dyke Marsh and the Potomac corridor south of Alexandria are home to bald eagles, which are often seen feeding on fish from the Potomac or perched along the shoreline.

The Virginia Department of Game and Inland Fisheries lists the peregrine falcon as a state-threatened species. The peregrine falcon has been reported within two miles of Alexandria as recently as 2012 and has been observed during the weekly Dyke Marsh bird walks as recently as September 2012.

The grizzled skipper (Appalachian Grizzled Skipper, *Pyrgus centaureae wyandot*) was last observed in Northern Virginia prior to 1950.

According to information from National Park Service biologists, two mussel species on the 2010 Maryland Species of Concern list have been observed at Daingerfield Island, within the city of Alexandria: the tidewater mucket (*Leptodea ochracea*), and the eastern pond mussel (*Ligumia nasuta*). The brook floater (*Alasmidonta varicosa*), mentioned in the permit, is also on the Maryland list, but has not been observed in the Potomac area included in the Park Service data (Great Falls to Mount Vernon).

These are examples that indicate to us that more thorough and more accurate information is needed on the flora and fauna that are affected by current and future combined sewer overflows from Alexandria.

**Staff Response:**

DEQ staff utilizes an online database, maintained by the Virginia Department of Inland Fisheries and Game, to conduct queries concerning threatened and endangered species within 2 miles of the discharge point. This was specifically stated in Section 15.d. of the Fact Sheet. Staff cannot verify or deny the correctness of the data made available to the agency.

The database search, as explained previously, lists both federal and state listed endangered and threatened species. It should be noted that this database was accessed approximately two years ago (25 August 2011) and may have been updated since that time. At that time, the database still had the Bald Eagle listed as endangered by the state.

Staff will consider including the species' scientific name as suggested above.

**Public Comment #11:**

The development and implementation of the LTCP is occurring at the same time as implementation of plans and projects to address Alexandria's allocation of stormwater reduction under the city of Alexandria's MS4 Phase II permit. Because the goals are congruent and projects may benefit, progress on both the MS4 and the CSS requirements, plans for the two activities should be coordinated and should be communicated to the public as joint activities.

***Staff Response:***

During the City's public meeting, held on 5 August 2013, City officials acknowledge the need and ongoing effort to coordinate the requirements for both the combined sewer system and the MS4 permit since the two are interrelated. Even though the Draft permit is silent on any coordination with the current and future stormwater requirements, the intent is that both permits and their respective requirements will compliment.

DEQ staff will forward this comment to the City for their consideration as they are the permit holder.

**Public Comment #12:**

We support the City's goal of making the voluntary CSS Area Reduction program requirement under the permit. The City was well advised to make the Potomac Yard trunk line oversized in anticipation of new hook ups. We also support the City's Payne & Fayette Sewer Separation project. While the permit has a goal of reducing overflows by at least 5 million gallons over the course of the permit period, we strongly recommend that the City exceed this goal through expediting the separation of sewers in the CSS.

***Staff Response:***

DEQ staff will forward this comment to the City for their consideration as they are the permit holder.



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August 12, 2013

*Submitted via email*

Douglas Frasier  
DEQ-Northern Regional Office  
13901 Crown Court  
Woodbridge, VA 22193  
Douglas.Frasier@deq.virginia.gov



Re: Comments on the city of Alexandria's Combined Sewer System (CSS) Permit Application (VA0087068)

Dear Mr. Frasier:

On behalf of Potomac Riverkeeper, Inc, I am submitting these comments on the City of Alexandria's Combined Sewer System draft permit application (Permit No. VA0087068).

Potomac Riverkeeper, a grassroots, nonprofit organization founded in 2000, includes the Potomac Riverkeeper and the Shenandoah Riverkeeper. Potomac Riverkeeper's mission is to stop pollution and restore clean water in the Potomac and Shenandoah Rivers and their tributaries. Its primary strategy is enforcement of the Clean Water Act and other environmental laws on behalf of its membership. Potomac Riverkeeper has over 2700 members throughout the four states and the District Columbia that comprise the almost 15,000 square mile Potomac watershed. It has offices in DC, Maryland, Virginia and West Virginia.

## Overview

The City of Alexandria issued its first permit regulating the Combined Sewer System (CSS) in 1995, followed by the adoption of its Long Term Control Plan (LTCP) in 1999. The LTCP consists of nine minimum technology-based requirements (included again in the draft permit application). As city staff stated at the August 5, 2013 public meeting, the 2001 and 2007 permit renewals continued the status quo and focused on monitoring the CSS. Now, the City has issued a draft permit that for the first time outlines objectives and strategies to reduce discharges from the CSS. Primarily, the draft permit focuses on the Bacteria Total Minimum Daily Load (TMDL) for Hunting Creek, with the recognition that "further reductions in CSOs are needed. . . to comply with the loadings specified in the recent Hunting Creek Bacteria TMDL."



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The Potomac River is one of the nation's jewels. It flows through four states (Virginia, West Virginia, Maryland and Pennsylvania) and the District of Columbia, and it is a source of drinking water for over five million residents. Each day, however, the Potomac River and its tributaries suffer thousands of assaults. Pollutants like fecal coliform, nitrogen, phosphorus, heavy metals, and pesticides coming from industrial, agricultural, urban, and other sources threaten and degrade its water quality. Stormwater runoff in urban and suburban areas has been the fastest growing source of pollution over the past 20 years due to an increase in impervious surfaces that has outpaced the increase in population. Once-abundant fish populations are diseased, dying, and in some cases even changing sexes. Algae blooms in nutrient-rich waters die, decay and cause oxygen deprived dead zones. Some algae blooms are toxic to aquatic animals and humans. Forty years after the passage of the Clean Water Act, we are now seeing the adoption and implementation of regulations and permits such as the Hunting Creek Bacteria TMDL and the implementation of Long Term Control Plans for Combined Sewer Systems that will finally address the pollution from thousands of sources throughout the Potomac watershed.

#### **Comments**

##### **X 1. Elimination of untreated sewage to local waterways and the Potomac River.**

Potomac Riverkeeper's believes that it is unacceptable to allow any amount of untreated sewage to enter the waterways from the City of Alexandria's CSS or any other source. While the permit application and the LTCP contain mitigation projects and practices to reduce the amount of combined sewer overflows, they do not contain the goal of eliminating entirely the introduction of untreated sewage.

##### **X 2. Consideration of downstream impacts.**

The permit application contains little information on the impacts of combined sewer overflows and pollution on downstream wildlife and human health. While the focus of the permit is on Hunting Creek Bacteria TMDL compliance, we believe that downstream impacts are quite serious and adverse on sensitive areas such as Dyke Marsh and should be evaluated, particularly the control of solid and floatable materials.

##### **X 3. More stringent reduction targets and earlier compliance date for updated LTCP.**

We are encouraged that the City of Alexandria will be developing an updated LTCP to achieve compliance with the Hunting Creek Bacteria TMDL within three years of issuance of the permit and will allow for public participation during its development. We support the City's plan to include targets for Outfall 001 even though it does not fall within the TMDL, and we urge the City to aim for a 99% reduction target. We also urge the City to review the 80% reduction target for Outfall 002 and instead have a target of 99%, the same as Outfalls 003 and 004.

We request that the City reduce the "no later" date for compliance of December 31, 2035. An expedited schedule is needed, given the increased frequency of events and the very small amounts of rainfall or snowmelt that can cause overflows. In addition, many studies demonstrate that as the climate becomes warmer, intense weather events such as severe rain and snow storms and hurricanes will become more frequent, further burdening stormwater and sewer systems.

**4. Green infrastructure not a substitute for eliminating sewer overflows.**

While implementation of green infrastructure or low-impact development should be required to decrease stormwater discharges, it is not a substitute for measures that eliminate sewer overflows. As presented in the CCS Permit Fact Sheet (p. 2-3), the "minimum rainfall for overflow event" amounts are quite small, at 0.03, 0.06, 0.16, and 0.21 inches. As a result, 139 overflow events in 2011 discharged nearly 113 million gallons into Hunting Creek and the Potomac. Since the minimum rainfall for an overflow event is quite low, the priority should be on disconnecting the sewer system from the CSS. In addition, we support the City's plan to implement improvements at Outfalls 003 and 004 on or before 30 months of the permit effective date.

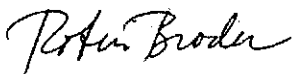
The permit application states that the "permittee shall study, implement and promote green infrastructure within the CSS watershed." We would like clarification on what is to be included in the "study." We believe that the effectiveness of green infrastructure and low-impact development is well studied and documented and that the focus should be on development and implementation.

**5. City should exceed its goal of reducing overflows by at least 5 million gallons over the course of the permit period.**

We support the City's goal of making the voluntary CSS Area Reduction program a requirement under the permit. The City was well advised to make the Potomac Yard trunk line oversized in anticipation of new hook ups. We also support the City's Payne & Fayette Sewer Separation project. While the permit has a goal of reducing overflows by at least 5 million gallons over the course of the permit period, we strongly recommend that the City exceed this goal through expediting the separation of sewers in the CSS.

Thank you for this opportunity to comment on the City of Alexandria's CSS permit application. We look forward to working with the city to accelerate the reduction and eventual elimination of combined sewer overflows.

Sincerely,



Robin Broder, Vice President  
Potomac Riverkeeper, Inc.  
1100 15<sup>th</sup> Street, NW, 11<sup>th</sup> floor  
Washington, DC 20005  
[robin@potomacriverkeeper.org](mailto:robin@potomacriverkeeper.org)

## **Frasier, Douglas (DEQ)**

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**From:** Gbooth123@aol.com  
**Sent:** Tuesday, August 13, 2013 1:07 PM  
**To:** Frasier, Douglas (DEQ)  
**Subject:** Alexandria permit

*The statement we submitted yesterday on Alexandria's CSS permit application had a misstatement. Please substitute this paragraph for the one we submitted.*

*(In the one we submitted the number "10" followed the word "nation's".)*

*Thank you.  
Glenda Booth  
President  
Friends of Dyke Marsh  
703-765-5233*

*Please confirm that you received our comments and this addition. Thank you.*

### **Unhealthy Waters**

The Potomac River, a drinking water source for five million people, is not healthy. In 2012, American Rivers identified the Potomac "the nation's most endangered river." In December 2011, the Potomac Conservancy gave the river a D, down from a D+ in 2007 when the Conservancy last "graded" the waterway. In 2011, the grade for overall health of the Potomac River was dropped from a C to a D by EcoCheck in partnership with the National Oceanic and Atmospheric Administration and the University of Maryland's Center for Environmental Science. Four of six indicators declined.

**Friends of Dyke Marsh Comments on the Alexandria Combined Sewer  
System Permit Application to the Virginia Water Control Board**

August 12, 2013



**To:** Douglas.Frasier@deq.virginia.gov  
DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193

**From:** Glenda C. Booth, President, Friends of Dyke Marsh, [www.fodm.org](http://www.fodm.org)  
P.O. Box 7183, Alexandria, VA 22307; telephone 703-765-5233

**Subject:** Friends of Dyke Marsh comments on the city of Alexandria's Combined Sewer System (CSS) Permit Application (VA0087068)  
<http://www.deq.virginia.gov/fileshare/wps/PERMIT/NRO/City%20of%20Alexandria%20CSS/>

On behalf of the Friends of Dyke Marsh, I am submitting these comments on the city of Alexandria's Combined Sewer System draft permit application (Permit No. VA0087068).

### **The Friends of Dyke Marsh**

The Friends of Dyke Marsh is a volunteer group dedicated to preserving, restoring and enhancing Dyke Marsh, a 480-acre freshwater tidal wetland in Fairfax County on the Potomac River just south of Alexandria, Virginia. The Dyke Marsh Wildlife Preserve is administered by the National Park Service.  
(<http://www.nps.gov/gwmp/planyourvisit/dykemarsh.htm>)

Inherent to the mission of the Friends of Dyke Marsh is support of efforts to assure that the Potomac River, Hunting Creek and other tributaries of the Potomac have the highest water quality possible and that water meets all state and federal clean water standards. The Alexandria CCS permit would allow release of combined sewer system overflows during wet weather events at an estimated annual volume of 112.8 million gallons into three water bodies immediately upstream from the Dyke Marsh Wildlife Preserve: Hooff's Run (tributary of Hunting Creek), Hunting Creek and Oronoco Bay of the Potomac River. Assuming 10 percent of this volume is from sanitary sewers,<sup>1</sup> 11.3 million gallons of untreated sewage would be dumped into waters that could flow into Dyke Marsh.

### **Importance of Dyke Marsh**

Dyke Marsh is one of the most significant temperate, tidal, freshwater, riverine marshes *nationally* in the park system. About 500 years old, Dyke Marsh is a remnant of the wetlands that once lined the Potomac River. Congress added the Dyke Marsh Wildlife Preserve as a nature preserve to the National Park Service system in 1959 "so that fish and wildlife development and their preservation as

wetland wildlife habitat shall be paramount." It has 300 known species of plants, 6,000 arthropods, 38 fish, 16 reptiles, 14 amphibians and over 230 birds. The 2012 Breeding Bird Survey identified 48 confirmed or probable breeding species in Dyke Marsh.<sup>2</sup>

Thousands of birds – songbirds, shorebirds, waterfowl, wading birds, raptors -- as well as the aquatic life and fish on which they feed, use Hunting Creek and Hunting Creek embayment. Many waterfowl winter in these waters, and some are year-round residents. Many species of shorebirds use this area for rest and feeding during migration. Our surveys show that shorebirds have declined in abundance there in recent years.

Dyke Marsh supports the only known nesting population of marsh wrens in the upper Potomac tidal zone. Marsh wrens were once found all along the marshes of the Potomac, but have declined rapidly with the disappearance of their habitat, habitat largely destroyed and impacted by humans. In 1950, 87 singing males were counted in Dyke Marsh, but by 1998 only 31 territories were found.<sup>3</sup> Even fewer have been found in recent years. Larry Cartwright, head of the annual FODM breeding bird survey says, "The fate of marsh wrens and least bitterns remain in doubt at Dyke Marsh, but the trend suggests eventual disappearance for at least the marsh wren." Other bird species of concern in Dyke Marsh include the least bittern (*Ixobrychus exilis*), king rail (*Rallus elegans*), Virginia rail (*Rallus limicola*) and sora (*Porzana carolina*).

Dyke Marsh is listed on the Department of Game and Inland Fisheries' Virginia Birding and Wildlife Trail. Dyke Marsh and the Hunting Creek Bridge are birding "hotspots" on e-bird.org, sponsored by the Cornell Ornithology Laboratory, the National Audubon Society and other organizations.

In addition, like all wetlands, Dyke Marsh provides important ecological services like enhancing water quality, filtering pollutants, buffering storm surges and absorbing floodwaters.

As far back as 1947, naturalist Louis Halle wrote that Dyke Marsh is "the nearest thing to primeval wilderness in the immediate vicinity of the city." Mount Vernon resident and U. S. Senator John Warner, has called the wetland "a magnificent little oasis."

Dyke Marsh has been abused over the years: excavated, dumped in and invaded by non-native species, like English ivy, porcelain berry, the Chinese snail and the snakehead fish. It suffers from poaching, runoff, pollution, trash and erosion. The health of Dyke Marsh is dependent on multiple factors but especially on strong management of air and water pollution in the region.

## **Unhealthy Waters**

The Potomac River, a drinking water source for five million people, is not healthy. In 2012, American Rivers identified the Potomac "the nation's 10 most endangered

river." In December 2011, the Potomac Conservancy gave the river a D, down from a D+ in 2007 when the Conservancy last "graded" the waterway. In 2011, the grade for overall health of the Potomac River was dropped from a C to a D by EcoCheck in partnership with the National Oceanic and Atmospheric Administration and the University of Maryland's Center for Environmental Science. Four of six indicators declined.

Hunting Creek is listed on the Virginia Department of Environmental Quality's 2012 list of Impaired Waters - 303(d) List.<sup>4</sup>

We note that the federal Clean Water Act became law in 1972 with the goal of achieving zero discharge of pollutants by 1985 and an interim goal to have "fishable" and "swimmable" water by 1983, a goal not yet met, 30 years later.

### **The CSS Permit Application**

The Friends of Dyke Marsh support the city's efforts to meet the Total Minimum Daily Load (TMDL) for Hunting Creek and the city's recognition that "further reductions in CSOs are needed. . . to comply with the loadings specified in the recent Hunting Creek Bacteria TMDL."<sup>5</sup>

The Friends of Dyke Marsh offer the following comments on the permit application and related documents, including addressing inadequacies of the Long Term Control Plan (LTCP), the need for better data and communication with the public and coordination with the city's MS4 Phase II permit.

### ***Inadequacies of the plan***

#### **X 1. Introduction of untreated sewage to waterways must be eliminated.**

Our overriding comment is that it is simply unacceptable to allow any amount of untreated sewage to enter the waterways from the city of Alexandria or any source in the 21st century. While the permit application and the LTCP contain mitigation projects and practices to reduce the amount of combined sewer overflows, they do not contain plans that would lead to eliminating the discharge of untreated sewage.

#### **X 2. The schedule for achieving the TMDL goals is far too long.**

Section E.4 of the draft permit requires the city to develop and complete implementation of the Long Term Control Plan Update for the Hunting Creek Bacterial TMDL "as soon as practicable" but no later than Dec. 31, 2035," 32 years from now. The city's first LTCP was approved by DEQ in February 1999.

The Friends of Dyke Marsh believe that taking 32 years to eliminate combined sewer overflows is far too long. A more aggressive schedule is needed, given the frequency of events and the very small amounts of rainfall or snowmelt that can cause overflows, as discussed in comment 6 below. In addition, many studies show that as the climate warms, intense weather events like severe storms and

hurricanes, will become more numerous and more frequent, further burdening the sewer system and exacerbating overflows.

### **3. Control solid and floatable materials.**

Section D.6 of the draft permit states that "the permittee shall continue to implement measures to control solid and floatable materials in the CSS," including "consideration" of entrapment and baffling devices to reduce discharges of solids and floatable materials.

The Friends of Dyke Marsh believe that "consideration" is too weak a requirement. Floatable materials -- cans, bottles, plastics, cigarette butts, trash of all kinds and other debris -- are widespread and common in the wetland and in Hunting Creek, clearly evident in a low-tide visit to the Hunting Creek Bridge on the George Washington Parkway or any visit to Dyke Marsh or the Potomac River shoreline in Fairfax County. The mudflats on both the creek and Potomac sides of the bridge, prominent feeding areas for shorebirds, egrets, herons, turtles and other species, are littered with debris.

Twice a day the tide washes up debris into Dyke Marsh and debris flows from Washington, D.C., Alexandria and boaters into Dyke Marsh. Among other concerns, we know that small animals can become trapped in cans and bottles. Fish, birds and other animals mistake cigarette butts for food. Plastic items rarely biodegrade. Animals mistake plastic and Styrofoam debris, especially small pieces, for food. Birds become entangled in six-pack rings. Animals can suffocate or choke when caught in plastic bags.

Trash from the Potomac can enter the Chesapeake Bay and the Atlantic Ocean, endangering freshwater and marine wildlife that may ingest or become entangled in the debris, resulting in injury or death.

The Alice B. Ferguson Foundation, which organizes annual cleanups in the Potomac watershed, collected 312 tons of trash to date in 2013.<sup>6</sup> While Alexandria constitutes a small portion of the watershed, the city's contribution seems to be concentrated in Hunting Creek and comes mainly from storm sewers. Members of the Friends of Dyke Marsh members engage in cleanups and report Hunting Creek as a rich source of debris of all kinds.

### **4. Signs at CCS outfalls**

Section D.8.a requires that "identification signs at all CSS outfalls are maintained and easily readable by the public."

While signs are currently posted, the wording on these signs is somewhat misleading. The wording is, in part, "Combined stormwater and sanitary sewage may be discharged at this location during and after heavy or long rain events." According to data on the minimum rainfall needed to cause an overflow event (see

comment 6 below), the terms "heavy" and "long" are misleading because according to the Fact Sheet, rainfall from 0.03 to 0.21 inches could lead to overflows. The current signs may lead citizens to misunderstand the likelihood of an overflow.

In addition, some of the signs are not easily readable by the public:

- The signs should stand at eye level. Two signs are too high to be easily read or even noticed by the public: the sign at Outfall 001 (Oronoco Bay) is eight feet four inches high (measured from boardwalk level to top of sign) and the sign for Outfalls 003/004 on the walkway along Holland Lane is nine feet two inches high (measured from ground to top of sign). Besides being too high, the Holland Lane sign is parallel rather than perpendicular to the path and thus not noticeable to walkers.
- The sign for Outfalls 003/004 along the path between Jamieson Avenue and Duke Street is barely visible through the vegetation inside the pathway railing. While we believe signs should be visible to the public, we hope you will try to preserve native plants in the area, like milkweed, the host plant for several butterfly species that are declining.

There is no sign on the east side of Hooff's Run in the area where the Run is accessible.

We also hope you will consider making the signs bilingual, in English and Spanish, given the area's growing Hispanic population.

## **5. Implementing green initiatives**

Section E.8.b of the draft permit says the "permittee shall study, implement and promote green infrastructure projects. . . ."

While the city may need to identify appropriate sites, the Friends of Dyke Marsh believe further study of "green infrastructure" or low-impact development approaches is unnecessary and will delay implementation. Green infrastructure is becoming more common and many examples exist across the U.S. that the city of Alexandria should adopt and implement, including Fairfax County, the District of Columbia, Chicago and Portland, Oregon.

## **6. Likely low impact of proposed mitigations**

We support the green initiatives and other mitigation approaches that we hope will reduce the amount of water flowing into the storm sewers. We note, however, that very little rainfall or snow melt is required to trigger an overflow event. As presented in the CCS Permit Fact Sheet (p. 2-3), the "minimum rainfall for overflow event" amounts are quite small, at 0.03, 0.06, 0.16, and 0.21 inches. As a result, 139 overflow events were expected during 2011, apparently according models, that put nearly 113 million gallons of overflow into Hunting Creek and the Potomac.<sup>7</sup>

At an August 5 meeting of the Alexandria Environmental Policy Commission, Mr. William J. Skrabak, Deputy Director of the city's Office of Environmental Quality,



was clear, that, in his words, "most rainfall events" cause overflow. He said that "the system cannot carry anything more than a slight drizzle."

It seems unlikely that the mitigation measures listed in the current draft permit will have a significant impact in reducing overflows.

### ***Need for better data and communication with the public***

#### **1. Outdated overflow event data**

Overflow event data are presented in the CCS Permit Fact Sheet (p. 4, Table 1). These data are out of date. The table notes that these data are either "Approximations; per permit application, dated 8 July 2011, for the time period of June 2010 – May 2011, or 2011 Annual Report Model Summary data." Given the monitoring described in the permit, more recent and some observation-based data should be provided, especially for the number of overflow events.

#### **2. Trends in bacterial levels**

Information on progress in achieving the Hunting Creek TMDL is difficult for the public to access online. For example, the 2011 Combined Sewer System Annual Report for 2011 contains appendices showing sampling results for Hunting Creek and Oronoco Bay. These data are point-in-time data and do not indicate trends over time. The CSS Permit Fact Sheet may contain this information in appendices, but pages 46 through the end are illegible.

The annual report required in Section E.5.a of the draft permit should contain information on trends in bacterial levels and other measures, and progress toward meeting the TMDL in language that the average person can understand. Trend data is critical in knowing how and whether water quality is improving or not.

#### **3. Publication of annual reports**

Section E.5.a of the draft permit requires the city to "publish the annual reports on the City's website and retain the reports on the website for a period of no less than two years."

Currently, we are unable to find an annual report on the city's website. The 2011 report, the 17<sup>th</sup> such report, is posted on the VDEQ website, although it is somewhat difficult to locate. According to August 2013, email communications with a city official, the 2012 annual report was completed in March 2013, but is not currently available on the city's website. A hard copy of the report can be viewed by appointment, thus making access cumbersome and limited.

The permit should require that annual reports be posted on the city of Alexandria website as soon as they are completed and be retained on the site a longer period. At a minimum, the three most recent reports should be retained on the site.

#### **4. Accuracy and currency of biological inventory**

The Fact Sheet (p. 7) provides information on threatened or endangered species that are in the vicinity of the discharges from the combined storm and sanitary sewers:

"The following threatened and endangered species were identified within a 2 mile radius of the outfalls: Brook Floater (mussel); Grizzled Skipper (butterfly); Bald Eagle; and Migrant Loggerhead Shrike (song bird)."

This information does not appear to be accurate or current. We urge DEQ to use accurate and more current data. Also, we recommend that scientific names also be included in the description of threatened and endangered species, as common names are variable.

Concerning the loggerhead shrike, the Virginia Society of Ornithology has documented a precipitous decline of this species.<sup>8</sup> No loggerhead shrike has been reported in Alexandria or in Dyke Marsh for at least 50 years, according to experienced bird watchers in the area.

The bald eagle is no longer listed as a federally-endangered species, having been removed from the list by the U.S. Fish and Wildlife Service in 2007. However, the bald eagle remains protected by federal law. Dyke Marsh and the Potomac corridor south of Alexandria are home to bald eagles, which are often seen feeding on fish from the Potomac or perched along the shoreline.

The Virginia Department of Game and Inland Fisheries lists the peregrine falcon as a state-threatened species.<sup>9</sup> The peregrine falcon has been reported within two miles of Alexandria as recently as 2012 and has been observed during the weekly Dyke Marsh bird walks as recently as September 2012.<sup>10</sup>

The grizzled skipper (Appalachian Grizzled Skipper, *Pyrgus centaureae wyandot*) was last observed in Northern Virginia prior to 1950.<sup>11</sup>

According to information from National Park Service biologists, two mussel species on the 2010 Maryland Species of Concern list have been observed at Daingerfield Island, within the city of Alexandria: the tidewater mucket (*Leptodea ochracea*), and the eastern pond mussel (*Ligumia nasuta*). The brook floater (*Alasmidonta varicosa*), mentioned in the permit, is also on the Maryland list, but has not been observed in the Potomac area included in the Park Service data (Great Falls to Mount Vernon).<sup>12</sup>

These are examples that indicate to us that more thorough and more accurate information is needed on the flora and fauna that are affected by current and future combined sewer overflows from Alexandria.

#### **5. Little information on impacts downstream**

The permit and fact sheet contain little information on the impacts of combined sewer overflows and pollution on downstream wildlife and human health.

While perhaps beyond the scope of normal permitting practices, we believe that downstream impacts on water quality and natural resources are quite serious, adverse and should be evaluated.

### ***Coordination with Chesapeake Bay MS4 permit.***

The development and implementation of the LTCP is occurring at the same time as implementation of plans and projects to address Alexandria's allocation of stormwater reduction under the city of Alexandria's MS4 Phase II permit. Because the goals are congruent and projects may benefit, progress on both the MS4 and the CSS requirements, plans for the two activities should be coordinated and should be communicated to the public as joint activities.

Thank you for the opportunity to submit these comments. We look forward to working with the city and state toward a cleaner Potomac River, its tributaries and a healthy and restored Dyke Marsh.

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<sup>1</sup> Based on comments by William J. Skrabak, Deputy Director, Transportation and Environmental Services, City of Alexandria, at the August 5, 2013, public meeting on the Draft CSS Permit.

<sup>2</sup> <http://www.fodm.org/reports.htm>

<sup>3</sup> University of Maryland Center for Environmental Studies, <http://www.umces.edu/sites/default/files/al/pdfs/dmp-wb2.pdf>

<sup>4</sup> [http://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterQualityAssessments/IntegratedReport/2012/jr12\\_Appendix1a\\_Category5\\_List.pdf](http://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterQualityAssessments/IntegratedReport/2012/jr12_Appendix1a_Category5_List.pdf)

<sup>5</sup> July 8, 2011 letter to Doug Frasier, DEQ, from Bruce Johnson.

<sup>6</sup> <http://fergusonfoundation.org/trash-free-potomac-watershed-initiative/potomac-river-watershed-cleanup/>

<sup>7</sup> CCS Permit Fact Sheet, Table 1, p. 4.

<sup>8</sup> *Virginia's Birdlife*, 4th Edition, 2007, p. 195.

<sup>9</sup> <http://www.dgif.virginia.gov/wildlife/virginiatescspecies.pdf>

<sup>10</sup> www.e-bird.org observation report 12/17/2012. Dyke Marsh sightings at <http://www.fodm.org/sighting.htm>

<sup>11</sup> Virginia Department of Conservation and Recreation's Virginia Rare Species list <http://www.vararespecies.org/95>

<sup>12</sup> Telephone conversation with Brent Steury, NPS, George Washington Memorial Parkway, 8/7/2013, Maryland list found at [http://www.dnr.state.md.us/wildlife/Plants\\_Wildlife/rte/pdfs/rte\\_Animal\\_List.pdf](http://www.dnr.state.md.us/wildlife/Plants_Wildlife/rte/pdfs/rte_Animal_List.pdf)

## **Frasier, Douglas (DEQ)**

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**From:** Frasier, Douglas (DEQ)  
**Sent:** Monday, July 29, 2013 12:43 PM  
**To:** 'Drudi, Dino - BLS'  
**Subject:** RE: Comments on City of Alexandria Draft Combined Sewer System Permit

Dino Drudi,

This acknowledges receipt of your comments; which will be included in the agency record for this permit reissuance.

Best regards,

***Douglas Frasier***

VPDES Permit Writer, Senior II  
Certified Nutrient Management Planner  
Regional Toxics Management Program Coordinator  
Department of Environmental Quality  
Northern Regional Office  
13901 Crown Court, Woodbridge, VA 22193  
Phone: 703-583-3873  
Fax: 703-583-3821  
[Douglas.Frasier@deq.virginia.gov](mailto:Douglas.Frasier@deq.virginia.gov)

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**From:** Drudi, Dino - BLS [<mailto:Drudi.Dino@bls.gov>]  
**Sent:** Monday, July 29, 2013 11:33 AM  
**To:** Frasier, Douglas (DEQ)  
**Cc:** 'Lalit.Sharma@alexandriava.gov'; 'contactus@alexandriava.gov'; 'Alexandria Times Letters'; 'Alex/MV Gazette'  
**Subject:** Comments on City of Alexandria Draft Combined Sewer System Permit

I am a homeowner in Old Town Alexandria and am hereby submitting the following formal comments:

1. Renew Alexandria's Combined Sewer System Permit without requiring extensive construction within either of Old Town's two the historic districts (Old & Historic or Parker-Gray);
2. Explicitly grandfather the combined sewers in Old Town's two the historic districts;
3. Seek congressional riders which ratify the proposed grandfathering.

Old Town's combined sewer system was considered state-of-the-art when it was installed and, consequently, should be grandfathered. Extensive construction work in the historic district would be expensive and disruptive because the streets are built to 18<sup>th</sup> and 19<sup>th</sup> Century "horse-cart" standards. The houses are old and historic, often sitting on slabs without cellars, and are vulnerable to vibration damage. Extensive construction would be unduly burden and inconvenience property owners, residents, and businesses in historic district.

The pollution resulting from the combined sewers in Old Town's two the historic districts has existed for over a century and was not considered environmentally overly burdensome on the infrequent occasions it occurred. The Potomac River and Hunting Creek can absorb and naturally clear some level of pollution. Water quality has degraded only as a consequence of new development after Old Town's combined sewers were installed, so priority should be given to reducing pollution from new development rather than overly burdening historic district.

Respectfully submitted,

Dino Drudi  
315 N West Street (contributing structure in the Parker-Gray Historic District)



## **Frasier, Douglas (DEQ)**

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**From:** Frasier, Douglas (DEQ)  
**Sent:** Tuesday, July 23, 2013 3:03 PM  
**To:** Thomas, Bryant (DEQ)  
**Subject:** FW: Alexandria Combined Sewer System Permit Reissue

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**From:** Kathryn Papp [mailto:kpappva@gmail.com]  
**Sent:** Tuesday, July 23, 2013 2:59 PM  
**To:** Frasier, Douglas (DEQ)  
**Subject:** Re: Alexandria Combined Sewer System Permit Reissue

Dear Douglas:

Thank you. I did realize that the Oronoco remediation was separate from combined sewage, and they're doing a great job. My concern is the state of all pipes laid down in that period, which the sewage pipes in the combined system are. I am familiar with similar systems in Pittsburgh and Philadelphia.

I've looked at the proposal to do a number of pilot projects as part of this effort. The track record on environmental pilot project relocation is very poor. The city's have never been extended for larger impact. I'll talk with Bill Skraback about this and see if there is an alternative that could be a better use of scarce funds.

Again, thank you. This may be on the city site, but it is good to have you "in the loop".

Best,  
Kathryn Papp

On Tue, Jul 23, 2013 at 2:06 PM, Frasier, Douglas (DEQ) <[Douglas.Frasier@deq.virginia.gov](mailto:Douglas.Frasier@deq.virginia.gov)> wrote:

Ms. Papp,

Thank you for your interest in the reissuance of the aforementioned permit. I have provided answers to your questions below. I will be referring to the Fact Sheet, which you may have already read, for the reissuance on some responses since this document provides a full explanation regarding your inquiries.

The Fact Sheet is available at the following address:

<http://www.deq.virginia.gov/filesare/wps/PERMIT/NRO/City%20of%20Alexandria%20CSS/>. This document is also available on the City's website.

Does the proposed release of overflows during wet weather events of the combined sewer system contain untreated human waste?

Yes, combined sewer overflows discharge a mixture of stormwater and untreated human waste during wet weather events.

Is there a time limit on reissuance of this permit, ie how long will this system be allowed by the state to expel waste water from the combined sewer systems into the Potomac?

The City will be exploring various options (green infrastructure, engineering projects etc) to include in the Long Term Control Plan Update which is due within 3 years after the permit is reissued. This update will provide the path forward to mitigate the combined sewer overflows to comply with the Hunting Creek Bacteria Total Maximum Daily Load. This implementation plan is to be completed as soon as practicable but no later than 31 December 2035 (see Page 12, Section 21.d. of the Fact Sheet for a detailed explanation).

Concurrently, during this time, the City will also be implementing projects to achieve a reduction of 5 million gallons of stormwater entering the system, or the bacteria equivalent, annually by the end of this permit term; which includes a sewer separation project, outfall improvements and green infrastructure projects (see Page 14, Section 21.h. of the Fact Sheet).

Although monitoring is well-described, how is reporting to the public on a regular basis done, especially concerning human health issues? This is of growing concern as severe weather events are increasing in this area, e.g., GAO is pursuing stricter requirements for FEMA to reimburse municipalities for frequent flood events.

The City is required to submit annual reports every year by 31<sup>st</sup> of March. These reports contain all monitoring data, projects completed and planned and various pertinent information concerning the operation and maintenance of this system. The City will be posting these reports on their website beginning with this permit term and are also available from Department of Environmental Quality-Northern Regional Office upon request. Previous annual reports are also available.

Recent remediation efforts in the Oronoco Bay area, a VA-DEQ designated brownfield site, has revealed sewer pipes in much worse condition than anticipated. How will reissuing this permit delay replacement of what seems to be a severely eroded system of deteriorating pipes?

I spoke with Lalit Sharma with the City of Alexandria regarding this project. The sewer at Oronoco St is a storm sewer (separate) and an insitu remediation system is being installed to address contamination from an old coal gasification plant. This work is being done under the Voluntary Remediation Program. This project is completely unrelated to combined sewer system and relining of the sewer is scheduled to be done from a infrastructure rehab standpoint.

There are two links with information on this project:

<http://alexandriava.gov/tes/oeq/info/default.aspx?id=3846#oronoco>

<http://alexandriava.gov/OronocoRemediationProject>

For further information, the project lead (information below) can also be contacted.

Daniel Imig, Project Manager  
Office of Environmental Quality (OEQ)  
Transportation & Environmental Services (T&ES)  
Email: [daniel.imig@alexandriava.gov](mailto:daniel.imig@alexandriava.gov)  
Telephone: 703-746-4070

This system, as many across the nation, is a remnant of early infrastructure that present challenges for the installation of controls and sewer separation; with no quick fix. With that, this permit is complex and contains many facets that are occurring simultaneously but are intertwined.

If you would care to discuss this permit further, please do not hesitate to contact me.

Best regards,

*Douglas Frasier*

VPDES Permit Writer, Senior II  
Certified Nutrient Management Planner  
Regional Toxics Management Program Coordinator  
Department of Environmental Quality  
Northern Regional Office  
13901 Crown Court, Woodbridge, VA 22193  
Phone: 703-583-3873



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**From:** Kathryn Papp [mailto:[kpappva@gmail.com](mailto:kpappva@gmail.com)]  
**Sent:** Friday, July 19, 2013 10:34 AM  
**To:** Frasier, Douglas (DEQ)  
**Cc:** Sharon Annear  
**Subject:** Alexandria Combined Sewer System Permit Reissue

Dear Mr. Frasier:

RE: The Public Notice - Environmental Permit for the City of Alexandria 301 King Street, Room 4100, Alexandria VA 22313 #VA0087-68 .

Questions:

1 - Does the proposed release of overflows during wet weather events of the combined sewer system contain untreated human waste?

2 - Is there a time limit on reissuance of this permit, ie how long will this system be allowed by the state to expel waste water from the combined sewer systems into the Potomac?

3 - Although monitoring is well-described, how is reporting to the public on a regular basis done, especially concerning human health issues? This is of growing concern as severe weather events are increasing in this area, e.g., GAO is pursuing stricter requirements for FEMA to reimburse municipalities for frequent flood events.

4 - Recent remediation efforts in the Oronoco Bay area, a VA-DEQ designated brownfield site, has revealed sewer pipes in much worse condition than anticipated. How will reissuing this permit delay replacement of what seems to be a severely eroded system of deteriorating pipes?

Comment:

This is not an uncommon situation in all old East Coast cities; however, it's continued existence has reached a point where it is highly questionable to allow any further delay in replacement and/or repair.

An updated plan is simply delay without action. Continued release of E. coli, chlorides, and certain suspended Solids is particularly harmful.

Thank you for your attention and effort in addressing my questions.

Sincerely,

Kathryn Papp

**State "Transmittal Checklist" to Assist in Targeting  
Municipal and Industrial Individual NPDES Draft Permits for Review**

**Part I. State Draft Permit Submission Checklist**

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	Alexandria Combined Sewer System
NPDES Permit Number:	VA0087068
Permit Writer Name:	Douglas Frasier
Date:	30 August 2012

Major [X]                      Minor [ ]                      Industrial [ ]                      Municipal [X]

I.A. Draft Permit Package Submittal Includes:	Yes	No	N/A
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?		X	
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?			X
8. Whole Effluent Toxicity Test summary and analysis?		X	
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics	Yes	No	N/A
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet or permit contain a description of the wastewater treatment process?			X
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?			X
5. Has there been any change in streamflow characteristics since the last permit was developed?		X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet or permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?	X		
a. Has a TMDL been developed and approved by EPA for the impaired water?	X		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?			X
10. Does the permit authorize discharges of storm water?			X
I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	

**I.B. Permit/Facility Characteristics – cont.**

	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?			X
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?			X
14. Are any WQBELs based on an interpretation of narrative criteria?			X
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?	X		
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

**Part II. NPDES Draft Permit Checklist**

**Region III NPDES Permit Quality Checklist – for POTWs**  
(To be completed and included in the record only for POTWs)

**II.A. Permit Cover Page/Administration**

	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

**II.B. Effluent Limits – General Elements**

	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	NOT APPLICABLE		
2. Does the fact sheet discuss whether “antibacksliding” provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X

**II.C. Technology-Based Effluent Limits (POTWs)**

	Yes	No	N/A
1. Does the permit contain numeric limits for <u>ALL</u> of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	NOT APPLICABLE		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?			
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?			
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?			
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?			
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			

**II.D. Water Quality-Based Effluent Limits**

	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?			X
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?			X
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a “reasonable potential” evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the “reasonable potential” evaluation was performed in accordance with the State’s approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have “reasonable potential”?	X		
d. Does the fact sheet indicate that the “reasonable potential” and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?			X
e. Does the permit contain numeric effluent limits for all pollutants for which “reasonable potential” was determined?			X

<b>II.D. Water Quality-Based Effluent Limits – cont.</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?			X
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?			X
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?			X
8. Does the record indicate that an “antidegradation” review was performed in accordance with the State’s approved antidegradation policy?			X

<b>II.E. Monitoring and Reporting Requirements</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	<b>NOT APPLICABLE</b>		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?		X	
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?			X
4. Does the permit require testing for Whole Effluent Toxicity?	X		

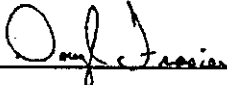
<b>II.F. Special Conditions</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
1. Does the permit include appropriate biosolids use/disposal requirements?			X
2. Does the permit include appropriate storm water program requirements?			X

<b>II.F. Special Conditions – cont.</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?	X		
a. Does the permit require implementation of the “Nine Minimum Controls”?	X		
b. Does the permit require development and implementation of a “Long Term Control Plan”?	X		
c. Does the permit require monitoring and reporting for CSO events?	X		
7. Does the permit include appropriate Pretreatment Program requirements?			X

II.G. Standard Conditions		Yes	No	N/A
1. Does the permit contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?		X		
List of Standard Conditions – 40 CFR 122.41				
Duty to comply	Property rights	Reporting Requirements		
Duty to reapply	Duty to provide information	Planned change		
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance		
Duty to mitigate	Monitoring and records	Transfers		
Proper O & M	Signatory requirement	Monitoring reports		
Permit actions	Bypass	Compliance schedules		
	Upset	24-Hour reporting		
		Other non-compliance		
2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?		X		

### Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	<u>Douglas Frasier</u>
Title	<u>VPDES Permit Writer, Senior II</u>
Signature	<u></u>
Date	<u>30 August 2012</u>

EPA Comment:

Pg. 1 of 8, Part I,A. Effluent Monitoring Requirements pg. footnote (2) states that outfall 002/003/004 shall comply with the TMDL bacteria waste loads, it should also state that the outfalls should comply with water quality standards.

DEQ Response:

A Special Condition was added with this revision in Part I.E.13, Page 9 of the permit:

*The permittee may not discharge in excess any effluent limitation necessary to meet applicable water quality standards imposed under the State Water Control Law or the Clean Water Act.*

This reflects language found in the DC0021199, District of Columbia Water and Sewer Authority's NPDES permit, Part II, Section A.2.

EPA Comment:

Pg. 5 of 8, Part I E. 4. LTCPU – "The final LTCPU shall be submitted on or before 4 years from the effective date for DEQ review and acceptance." This is far too long of a period of time to submit the LTCPU for review and approval after DEQ has commented on the LTCPU. Alexandria should only have no more than 1 year to submit the LTCPU. Four years is an excessive period of time. The word acceptance is inappropriate for permit language. The correct wording should be review and approve if the LTCPU meets EPA LTCP Guidance (EPA-832-B-95-002).

DEQ Response:

The draft permit incorporates a regulatory framework which institutes a dual approach to developing and implementing CSO controls. The two approaches are complimentary and combine both short term and long term initiatives. The required short term programs will achieve CSO reductions during the permit term. The long term, and primary requirement, is the update of the Long Term Control Plan (LTCP) to ultimately achieve compliance with the Hunting Creek bacteria TMDL, including all applicable water quality standards. It is important to note that the near term programs and controls being instituted to achieve results during the permit term will also help to inform final decisions to be incorporated in the LTCPU.

Please refer to the Fact Sheet on Page 12, Section 21.d for a discussion of the regulatory requirements contained within the draft permit. A 3-year period for submittal of a final Update for approval has been proposed. This would allow for a value-engineered approach for mitigating the overflows while engaging all concerned parties; Fairfax County, the City of Alexandria, AlexRenew Enterprises and the public. It also recognizes that there will be significant development and implementation of CSO control actions and measures during this permit term. Specifically, (1) green infrastructure projects will be installed and evaluated to determine effectiveness and possible incorporation into the LTCPU; (2) a sewer separation



project will commence, with the ultimate goal of disconnecting ninety-two (92) sanitary connections from the combined sewer system and rerouting the flows to a separate sanitary sewer system; and (3) outfall improvements will be required with the goal of capturing additional wet weather flow. Ultimately, the permittee must obtain a reduction in bacteria loading to be achieved either through at least a 5 million gallon annual reduction of stormwater entering the CS5, or the equivalent E. coli load reduction, during this permit term.

Note that the word 'acceptance' has been replaced with 'approval' in all locations where it appeared in the draft permit.

EPA Comment:

The draft permit states, "The LTCPU shall contain clearly defined, measurable milestones that will demonstrate compliance with the aforementioned TMDL as soon as practiced but no later than 31 December 2035." Twenty two (22) years to meet the TMDL is far too long time, not to mention fully implementing the LTCPU. Also, the permit fails to state the Alexandria has to meet the water quality standards and meet LTCP requirements, as stated in the **EPA LTCP Guidance (EPA-832-B-95-002)**.

DEQ Response:

As discussed above, the regulatory approach incorporated into the draft permit includes both near term and long term requirements, each with associated goals and outcomes. DEQ supports this path forward as it both achieves results in the short term, while also ultimately ensuring compliance with water quality standards. Once finalized, the LTCPU will be required to be fully implemented in less than 20 years in order to meet the 2035 compliance date.

Please refer to the Fact Sheet, Page 12, Section 21.d for details on the LTCPU. It is staff's best professional judgement that this time frame is justified given the complex nature of this system. This is a highly developed, densely populated area presenting challenges that other systems across the nation face with legacy combined sewer systems. Integrated gray and green engineering projects require extensive engineering evaluation, planning and implementation, even for relatively small CSSs. Furthermore, this general regulatory approach to more fully incorporate green infrastructure and to integrate stormwater and wastewater controls is consistent with the approaches encouraged by EPA in memorandum's published in 2011(see Fact Sheet Attachments 15 & 16).

Finally, it should be noted that staff anticipates that sewer separation will be the primary vehicle for achieving compliance. The implementation schedule reflects this understanding. However, complete sewer separation would impact businesses and residents, possibly producing economic impacts to the area. CSO Control Policy, Section II.C.5 does allow for appropriate cost/performance considerations to help guide the selection of controls. Therefore, it is also understood that if engineering controls that are less disruptive, yet just as effective are found to be the best option, then the implementation time frame could be reduced.

The Fact Sheet explicitly states that the LTCPU will also provide for combined sewer overflow controls to comply with all applicable water quality standards for the receiving waters (*EPA Guidance for LTCP, September 1995*), consistent with the Clean Water Act Section 402(q) and State Water Control Law.

EPA Comment:

Pg. 6 of 8, Part I E. 8.a, Combined Sewer Service Area Reduction Plan(ARP) requires the separation of storm and development projects whenever feasible. An estimated schedule should be provided and the whenever feasible statement be deleted.

DEQ Response:

The ARP is dictated by development/redevelopment within the CSS sewer shed area; thus, dependent upon the area's economic engine. This is a factor outside the control of the City. However, the City is required to submit any ongoing and proposed development projects and schedules annually that are occurring/would occur in the CSS sewer shed (Part I.E.8.a.).

The statement 'whenever feasible' has been removed.

EPA Comment:

Pg. 6 of 8, Part I E. 8.c, Green Public Facilities, A plan of the proposed city maintenance work and the options available for inclusion of green infrastructure projects should be presented. Remove feasible options shall be implemented.

DEQ Response:

The revised draft permit requires the City to submit: (1) a schedule of maintenance/enhancement projects at city facilities within the CSS sewershed for the forthcoming fiscal year; (2) the City's process for evaluating inclusion of green infrastructure; and (3) green infrastructures planned for selected projects with each annual report (Part I.E.8.c.).

The above 'feasible options shall be implemented' language has been removed.

EPA Comment:

Pg. 7 of 8. Part I E. 8.e, there is no schedule attached to the requirement implement proposed improvements at outfall 003/004. A schedule with defined milestones to complete this work is required.

DEQ Response:

The revised draft permit requires the City to implement the final improvements at Outfall 003 and Outfall 004 thirty (30) months from the permit effective date. Additionally, the City is required to submit a Preliminary Engineering Report (PER) to DEQ for review and approval once the final alternative is selected and prior to beginning any improvements (Part I.E.8.e).

EPA Comment:

Pg. 7 of 8. Part I.E. 9., Green Maintenance proposes a data base to track projects, again the delivery date is the end of the permit term. Interim milestones need to be established.

DEQ Response:

The revised draft permit requires the City to submit updates within 12 and 24 months of the permit effective date with a final report detailing the development and implementation of the database within 36 months of the permit effective date (Part I.E.9.).